CS160: User Interface Design

Task Analysis & Contextual Inquiry 02/01/12

Berkeley
UNIVERSITY OF CALIFORNIA

http://www.youtube.com/watch?v=KHILJBw-104

99% INVISIBLE

A TINY RADIO SHOW ABOUT DESIGN
WITH ROMAN MARS

Episode 4: 99% Details

EECS Colloquium

Exploring the Universe with Interactive Art

San Francisco artist and entrepreneur Scott Snibbe will present selections from twenty years of interactive exhibits, interactive art, and interactive music. He will show many examples of interactive media with technologies including computer vision, haptics, multitouch, and iPads, including recent work creating the first app album with Björk: Biophilia; and the recent interactive exhibits for James Cameron's movie Avatar. He will discuss the educational and societal benefits of interactivity; and the joys, challenges, and research involved in the creation and distribution of interactive media on the cutting edge of interactive technology.

Wed Feb 1, 4-5pm Soda 306

Scott Snibbe

Borrowing a Kinect

$150 Check to UC Regents

Will leave uncashed unless not returned by end of term

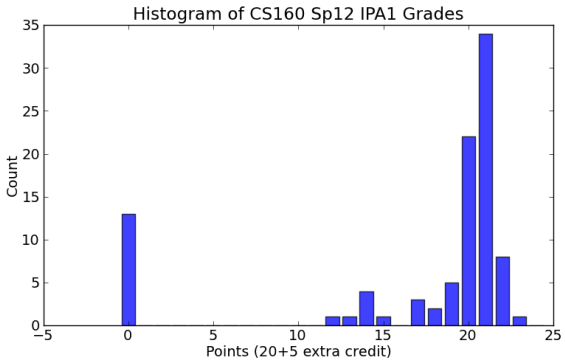
We have a limited supply

Up to 2 Kinects per group

Come to Soda 514 today 3:30-5pm

More times listed on Piazza

Due Last Monday: IPA1



Grades on bSpace soon…

Regrades: Write down where you think you deserve more points and submit physical copy to us. We will regrade entire assignment. Your grade can decrease during regrading.

Due Last Monday IDA 1

More observations/interviews early on
More detail in prototypes
More extensive user testing

Grades on bSpace soon…

Upcoming Due Dates

Mon. Feb 6: Group Brainstorm

Mon. Feb 13: Individual Programming Assignment 11

Submit Narrated Video!

Wiki has instructions

You can observe a lot by just watching.

- Yogi Berra

Main Points of Today's Lecture

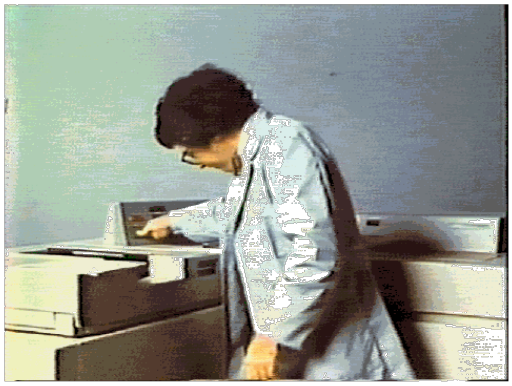
Don't just trust your intuition to make design decisions

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 – Anthropology) at Xerox PARC suggests videotaping interactions.



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

About those "average" users…

Allen Newell

(ACM Turing Award Winner)

Ron Kaplan

(ACM Fellow, Chief Scientist at Powerset/Bing)

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

Prompted "pager" studies"

Many varieties of observation techniques:

Ethnography / Ethnomethodology

Task Analysis

Contextual Inquiry

Cultural Probes

Diary Studies

Prompted "pager" studies"

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

Task Analysis

BART Ticket Machine

Goals:

Buy new ticket

Add value to ticket

Pay with:
Debit, Credit, Cash

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?
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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)?

Values, Likes/Dislikes

(i.e. May not like driving)

Who (BART)?

Values, Likes/Dislikes

May not like driving

Want minimum fuss

Sometimes in a hurry

Maybe frugal (like saving money)

Maybe environmentalists

Hate having money eaten

Want to feel safe and maintain privacy

Hate feeling stupid

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 disabled users (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.

Video by Ljuba Miljkovik & Ben Cohen

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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

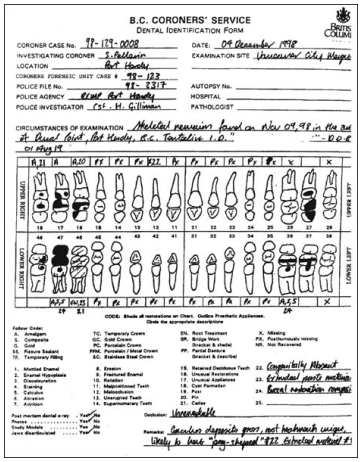
Example: On-Line Medical Records

Dental office installed new automated billing system

Assistants unhappy with new system

Old forms had hand-written notes

e.g., patient A's insurance takes longer than most, etc.



B.C. CORONERS' SERVICE
DENTAL IDENTIFICATION FORM

Task Analysis Questions

1. Who is going to use system?
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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

Panhandlers, musicians,
reading the paper, cell 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

Other Tools

Users work with collection of tools

Cell phone

Home PC

Printed schedules

Maps

Can we use other tools to facilitate interaction?

Other Tools (BART)

Credit, debit cards (today)

E-wallet in cell phone or organizer (someday)

Real-time train info on the web

User has PC at home

Could provide auditing for them?

Text on phone, use for BART delay alerts?

IDEO/DocoMo from Moggridge, Designing Interactions

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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

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!

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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)

When Things Go Wrong (BART)

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 (use personas or profiles)

Design can really differ depending on the target user

Name names (allows getting more info as necessary)

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

Some describe a complete job

Forces us to consider how features work together

Using Tasks in Design

1. Write up a description of the tasks
2. Produce scenarios covering each task
3. 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

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.

Using Tasks in Design

Produce scenarios covering each task

Elaborated scenario example:

It's Friday afternoon and Joe is flying to Sydney. He doesn't have enough money for a taxi to the airport, and he's running late.

He goes to the local ATM and identifies himself.

He specifies that he wants $100 from his savings account. He'd like the money in $20 notes so that he can give the taxi driver the correct change.

He doesn't want a printed receipt, as he doesn't bother keeping track of transactions in this account.

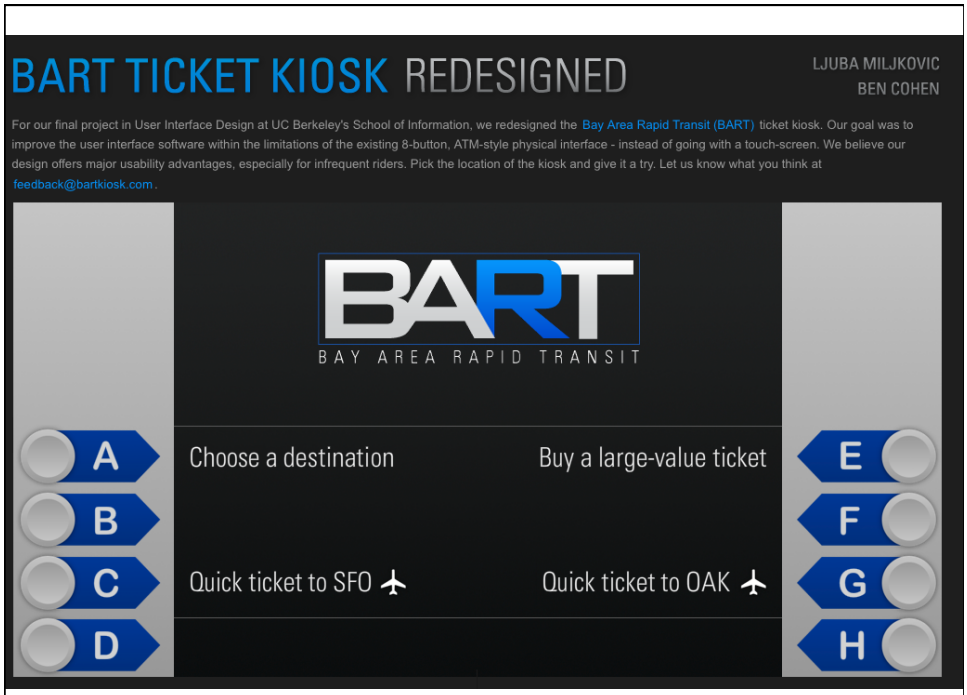
Using Tasks in Design

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)



http://www.bartkiosk.com/

Contextual Inquiry

Goals

Method:

"Go where the customer works, observe the customer as she works, and talk to the customer about their work" [Holtzblatt]

Goals:

Get inside the user's head

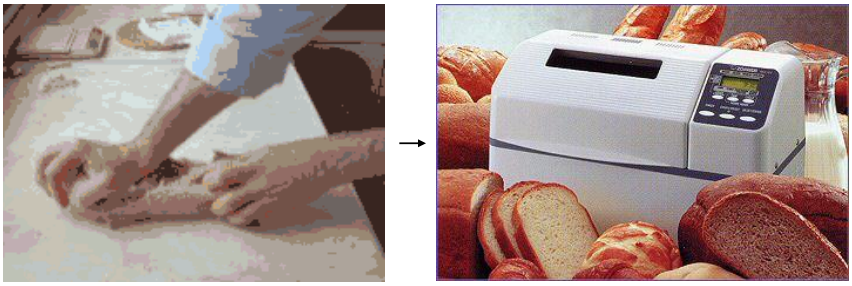
See their tasks the way they do

A middle ground between pure observation and pure interview

Guideline: Master-Apprentice Model

Allows user to teach us what they do

- Skill knowledge is usually tacit (can't put it in books)
- Sometimes literal apprenticeship is best



Matsushita Home Bakery – First automatic bread maker to have twist/stretch motion [Nonaka 95]

Principles of Contextual Inquiry

1. Context
2. Partnership
3. Interpretation
4. Focus

Principles: Context

Go where the work is:
Conduct inquiry in a normal work environment

People summarize, but we want details

Keep it concrete when people start to abstract

"We usually get reports by email", ask "Can I see one?"

Look for skipped steps, ask user to fill them in

Principles: Partnership

Master / Apprentice + intermittent probing

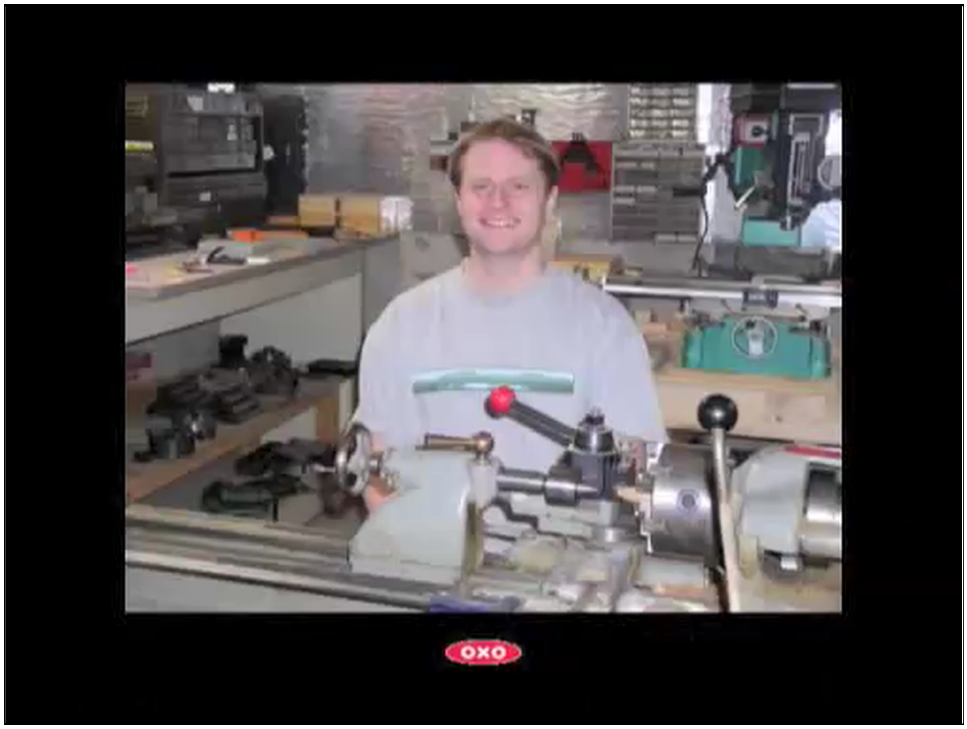
Alternative models (what's wrong with them?)

Interviewer / Interviewee

Expert / Novice

Guest / Host

Why not just interview folks?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