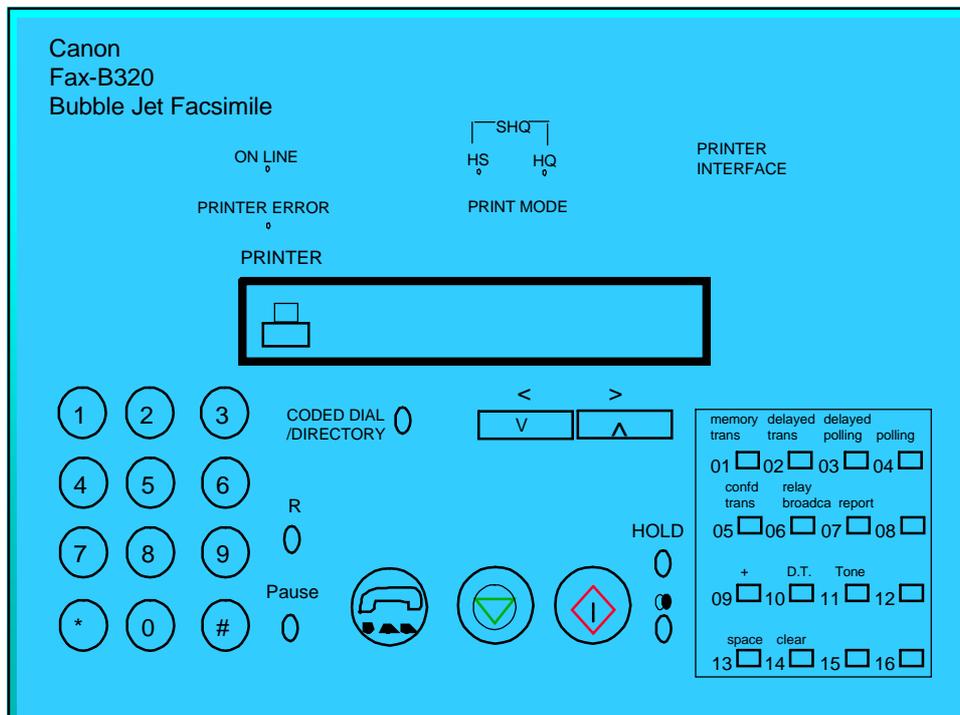


Qualitative Evaluation Techniques

Quickly debug and evaluate prototypes by observing people using them

Specific evaluation methods helps you discover what a person is thinking about as they are using your system

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Qualitative methods for usability evaluation

Qualitative:

- produces a description, usually in non-numeric terms
- may be subjective

Methods

- Introspection
- Extracting the conceptual model
- Direct observation
 - simple observation
 - think-aloud
 - constructive interaction
- Query via interviews and questionnaires
- Continuous evaluation via user feedback and field studies

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The Introspection Method

Designer tries the system (or prototype) out

- does the system “feel right”?
- most common evaluation method

Benefits

- can probably notice some major problems in early versions during every day use

Problems

- not reliable as completely subjective
- not valid as introspector is a non-typical user

Intuitions and introspection are often wrong



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Conceptual Model Extraction

Show the user static images of:

- the paper prototype *or*
- screen snapshots *or*
- actual system screens during use

Have the user try to explain

- what all elements are
- what they would do to perform a particular task

Initial vs formative conceptual models

- **Initial:** how person perceives a screen the very first time it is viewed
- **Formative:** the same, except after the system has been used for a while

This approach is:

- Excellent for extracting a novice's understanding of system
- Poor for examining system exploration and learning
- Requires active intervention by evaluator, which can get in the way

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Direct observation

Evaluator observes and records users interacting with design/system

- in lab:
 - user asked to complete a set of pre-determined tasks
 - a specially built and fully instrumented usability lab may be available
- in field:
 - user goes through normal duties

Excellent at identifying gross design/interface problems

Validity/reliability depends on how controlled/contrived the situation is

Three general approaches:

- simple observation
- think-aloud
- constructive interaction

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Simple Observation Method

User is given the task, and evaluator just watches the user

Problem

- does not give insight into the user's decision process or attitude



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The Think Aloud Method

Subjects are asked to say what they are thinking/doing

- what they believe is happening
- what they are trying to do
- why they took an action
- Gives insight into what the user is thinking

Problems

- awkward/uncomfortable for subject (thinking aloud is not normal!)
- “thinking” about it may alter the way people perform their task
- hard to talk when they are concentrating on problem

Most widely used evaluation method in industry



Hmm, what does this do? I'll try it... Oops, now what happened?

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The Constructive Interaction Method

Two people work together on a task

- normal conversation between the two users is monitored
 - removes awkwardness of think-aloud
- Variant: Co-discovery learning
 - use semi-knowledgeable “coach” and naive subject together
 - make naive subject use the interface
- results in
 - naive subject asking questions
 - semi-knowledgeable coach responding
 - provides insights into thinking process of both beginner and intermediate users



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Recording observations

How do we record user actions during observation for later analysis?

- if no record is kept, evaluator may forget, miss, or mis-interpret events
- paper and pencil
 - primitive but cheap
 - evaluators record events, interpretations, and extraneous observations
 - hard to get detail (writing is slow)
 - coding schemes help...
- audio recording
 - good for recording talk produced by thinking aloud/constructive interaction
 - hard to tie into user actions (ie what they are doing on the screen)
- video recording
 - can see and hear what a user is doing
 - one camera for screen, another for subject (picture in picture)
 - can be intrusive during initial period of use



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Coding scheme example...

tracking a person's activity in the office

s = start of activity
e = end of activity

Time	Desktop activities			Absences		Interruptions	
	working on computer	working on desk	initiates telephone	away from desk but in room	away from room	person enters room	answers telephone
9:00							
9:00							s
9:02	e						
9:05					s		e
9:10			s				
9:13					e		



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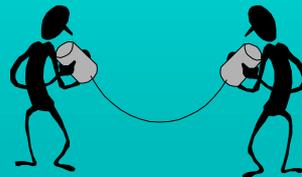
Querying Users via Interviews

Excellent for pursuing specific issues

- vary questions to suit the context
- probe more deeply on interesting issues as they arise
- good for exploratory studies via open-ended questioning
- often leads to specific constructive suggestions

Problems:

- accounts are subjective
- time consuming
- evaluator can easily bias the interview
- prone to rationalization of events/thoughts by user
 - user's reconstruction may be wrong



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How to Interview

Plan a set of central questions

- could be based on results of user observations
- gets things started
- focuses the interview
- ensures a base of consistency

Try not to ask leading questions

Start with individual discussions to discover different perspectives, and continue with group discussions

- the larger the group, the more the universality of comments can be ascertained
- also encourages discussion between users

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Retrospective Testing

Post-observation interview to clarify events that occurred during system use

- perform an observational test
- create a video record of it
- have users view the video and comment on what they did
 - excellent for grounding a post-test interview
 - avoids erroneous reconstruction
 - users often offer concrete suggestions



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Querying users via Questionnaires and Surveys

Questionnaires / Surveys

- preparation “expensive,” but administration cheap
 - can reach a wide subject group (e.g. mail)
- does not require presence of evaluator
- results can be quantified
- only as good as the questions asked



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Querying Users via Questionnaires / Surveys

How

- establish the purpose of the questionnaire
 - what information is sought?
 - how would you analyze the results?
 - what would you do with your analysis?
- do not ask questions whose answers you will not use!
 - e.g. how old are you?
- determine the audience you want to reach
 - typical survey: random sample of between 50 and 1000 users of the product
- determine how would you will deliver and collect the questionnaire
 - on-line for computer users
 - web site with forms
 - surface mail
 - including a pre-addressed reply envelope gives far better response
- determine the demographics
 - e.g. computer experience

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Styles of Questions

Open-ended questions

- asks for unprompted opinions
- good for general subjective information
 - but difficult to analyze rigorously

Can you suggest any improvements to the interfaces?

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Styles of Questions

Closed questions

- restricts the respondent's responses by supplying alternative answers
- makes questionnaires a chore for respondent to fill in
- can be easily analyzed
- but watch out for hard to interpret responses!
 - alternative answers should be very specific

Do you use computers at work:

often sometimes rarely

vs

In your typical work day, do you use computers:

- over 4 hrs a day
- between 2 and 4 hrs daily
- between 1 and 2 hrs daily
- less than 1 hr a day

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Styles of Questions

Scalar

- ask user to judge a specific statement on a numeric scale
- scale usually corresponds with agreement or disagreement with a statement

Characters on the computer screen are:

hard to read easy to read

1 2 3 4 5

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Styles of Questions

Multi-choice

- respondent offered a choice of explicit responses

How do you most often get help with the system? (tick one)

on-line manual

paper manual

ask a colleague

Which types of software have you used? (tick all that apply)

word processor

data base

spreadsheet

compiler

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Styles of Questions

Ranked

- respondent places an ordering on items in a list
- useful to indicate a user's preferences
- forced choice

Rank the usefulness of these methods of issuing a command
(1 most useful, 2 next most useful..., 0 if not used)

 2 command line

 1 menu selection

 3 control key accelerator

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Styles of Questions

Combining open-ended and closed questions

- gets specific response, but allows room for user's opinion

It is easy to recover from mistakes:

disagree agree comment: *the undo facility is really helpful*
1 2 3 4 5

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Continuous Evaluation

Usually done in later stages of development

- (ie beta releases, delivered system)

Good for monitoring problems of system in actual use

Problems can be fixed in next release

a) User feedback via gripe lines

- users can provide feedback to designers while using the system
 - email
 - special built-in gripe facility
 - telephone hot line
 - help desks
 - suggestion box
 - bulletin board
- best combined with trouble-shooting facility
 - users always get a response (solution?) to their gripes



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Continuous evaluation...

b) Case/field studies

- careful study of “system usage” at the site
- good for seeing “real life” use
- external observer monitors behaviour or gets feedback via methods described above



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What you now know

Observing a range of users use your system for specific tasks reveals successes and problems

Qualitative observational tests are quick and easy to do

Several methods reveal what is in a person's head as they are doing the test

Particular methods include

- Conceptual model extraction
- Direct observation
 - simple observation
 - think-aloud
 - constructive interaction
- Query via interviews, retrospective testing and questionnaires
- Continuous evaluation via user feedback and field studies

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