Section 4: Data Gathering

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Contents

1 Types of Data

1.1 Qualitative

- descriptions
- observable
  - ➢ not measurable
  - ➢ open-ended
- you can **assign** values to qualitative data
  - ➢ but this is **still not quantitative**

1.2 Quantitative

- numbers
  - ➢ measurable
- test specific characteristics
  - ➢ hypothesis testing

1.3 Objective

- external measure
  - ➢ facts
  - ➢ precise measurement

1.4 Subjective

- **not** from external measure
  - ➢ personal opinion
  - ➢ personal judgement

	QUANTITATIVE	QUALITATIVE
OBJECTIVE	"The chip speed of my computer is 2 GHz"	"Yes, I own a computer"
SUBJECTIVE	"On a scale of 1-10, my computer scores 7 in terms of its ease of use"	"I think computers are too expensive"

Figure 1.1: Types of data which might describe a user's computer.

2 Collection Methods

2.1 Questionnaires

- good for
  - ➢ requirements research
  - ➢ measure usability
- questions can be
  - ➢ open
    - easy to analyze
  - ➢ closed
    - unrestricted
    - less bias
- supports large populations
- many media
  - ➢ paper
  - ➢ email
  - ➢ web
  - ➢ etc.

2.1.1 Problems?

- order of questions can create bias
- different versions for different populations?
- need **clear instructions**
- questionnaire design
  - ➢ need whitespace
  - ➢ should also be compact enough
  - ➢ graphic design matters
- wording is important
  - ➢ phrases positive, negative, mixed

2.1.2 Question Types

1. single answer checkboxes/radio buttons
2. multi-option checkboxes
3. rating scales
   - Likert (ordinal) scale
   - semantic scale
4. ranking questions
5. open-ended
6. conditional sub-questionnaires

Single/Multi Answer Multiple Choice

- be specific
  - ➢ "1-3 times" vs "rarely"
- cover all possibilities
  - ➢ **no overlap**
- categorical stats

Likert (Ordinal) Scale

- measures
  - ➢ opinions

  - ➢ beliefs
  - ➢ likes/dislikes
- posit claim
  - ➢ ask about agreement
- usually 3-10 choices
  - ➢ odd number allows neutrality
  - ➢ even number forces a choice
- anchored with labels
  - ➢ at least endpoints
  - ➢ sometimes each option
- problems
  - ➢ open to user interpretation
  - ➢ user can distort distance between choices
  - ➢ acquiescence bias
    - reverse half the questions to avoid this

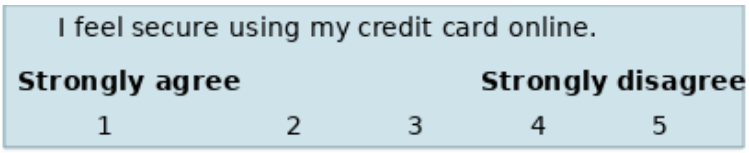

Figure 2.1: An example of the Likert scale with anchors on either end of the options.

Semantic Scale

- measures
  - ➢ opinions
  - ➢ beliefs
- two opposing poles
  - ➢ explore a range of attitudes ranging from
    - one pole
    - to the other
- each pole is assigned an adjective for an attitude

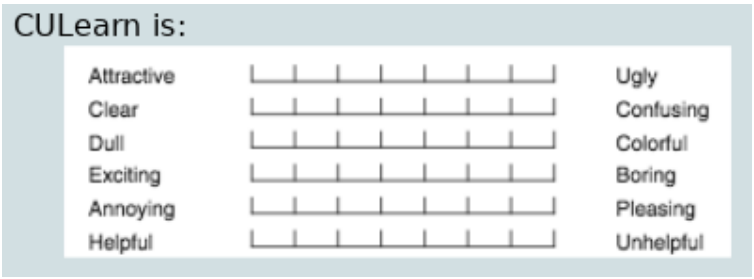

Figure 2.2: An example of the semantic scale for cuLearn.

Ranked Questions

- rank choices in a list
  - ➢ forces user to choose
  - ➢ indicates preferences

Open-Ended Questions

- users give opinions
- unconstrained
  - ➢ hard to tabulate
  - ➢ time consuming
    - to fill in
    - to evaluate

2.1.3 Guidelines

- clear language
- no leading questions
- equal weight to multiple choice answers
- no double negative questions
- no double barreled questions
  - ➢ two questions in one
- no embarrassing questions
- design with a clear purpose
- keep it short
- use as a secondary source
- test questions and validity
- test analysis
- is there an existing questionnaire for the same thing?
- consider privacy/security

2.2 Observation

2.2.1 Simple Observation

- evaluator watches user complete a task
  - ➢ no insight into user's decision making
  - ➢ no insight into user's attitude

2.2.2 Think-Aloud Observation

- participants say out loud what they are
  - ➢ thinking
  - ➢ doing
- problems?
  - ➢ awkward for subject
  - ➢ may alter the way they perform the task
  - ➢ hard to talk and concentrate

2.2.3 Co-Discovery Observation

- two people work together on a task
  - ➢ record conversation
  - ➢ think-aloud awkwardness is more natural
  - ➢ thinking process of both users

2.3 Interviews

2.3.1 Types of Interviews

- unstructured
  - ➢ not directed by script
  - ➢ rich

    - ➢ not replicable
- structured
    - ➢ scripted, similar to questionnaire
        - ■ why not just do a questionnaire (questionnaires are cheaper)?
    - ➢ lacks richness
    - ➢ replicable
- semi-structured
    - ➢ guided by a script
    - ➢ ideas can still be explored in depth
    - ➢ good balance between
        - ■ richness
        - ■ replicability

2.3.2 Types of Questions

- closed
    - ➢ how many times a week do you buy coffee at this store?
- open
    - ➢ how does buying coffee here compare to other places?

2.3.3 Interview Format

Pre-Interview

- prepare/read consent form
- prepare script
- determine team roles and note-taking
- schedule participant

Interview

- participant read/sign consent form
- conduct interview
- thank participant

Post-Interview

- debrief with team
    - ➢ write down
        - ■ impressions
        - ■ thoughts
    - ➢ edit notes
- take care of notes and consent forms

Script

- start
    - ➢ introduce study and purpose
    - ➢ small talk to make person feel at ease
    - ➢ set expected time
    - ➢ answer admin questions
- get participant background
- cover remaining issues in script
- finish with easy questions
    - ➢ non-controversial
- wrap up, debrief

2.3.4 Guidelines

- make participant feel at ease
- allow flexibility
- practice first
- pick representative users
- avoid bias
- natural setting
- participant should do 80% of the talking
- probe/prompt without leading
- keep an eye on the time

2.3.5 Group Interviews (Focus Groups)

- 2-10 people
- structured or unstructured
  - ➢ usually at least an agenda
- skilled moderator important
- audio/video recorded

Advantages

- diverse and sensitive issues
- social context
  - ➢ could also be a disadvantage
    - unpopular opinions less likely to be expressed?
- helps locate good participants for further study

Disadvantages

- some interviewees dominate
- expensive

2.3.6 Retrospective (Post-Task) Interview

- interview after completing a task
  - ➢ find out how it went
  - ➢ where did things go wrong?
  - ➢ what happened?

Advantages

- good for followup
- users offer concrete suggestions

Disadvantages

- takes time
- second session?