CSC4130
Introduction to Human-Computer Interaction

Lecture 8
Needfinding I: Surveys and Diaries

Outline

- Survey
- Diary

Outline

- Survey
- Diary

Survey

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- A well-defined and well-written set of questions to which an individual is asked to respond

Student Course Evaluation Questionnaire

(To be filled by each Student at the time of Course Completion)

Questionnaire	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
1. The course objectives were clear	□	□	□	□	□
2. The Course workload was manageable	□	□	□	□	□
3. The Course was well organized (e.g. timely access to materials, notification of changes, etc.)	□	□	□	□	□
4. I think the Course was well structured to achieve the learning outcomes (there was a good balance of lectures, tutorials, practical etc.)	□	□	□	□	□
5. The learning and teaching methods encouraged participation.	□	□	□	□	□
6. The overall environment in the class was conducive to learning.	□	□	□	□	□
7. Classrooms were satisfactory	□	□	□	□	□
8. The Course stimulated my interest and thought on the subject area	□	□	□	□	□
9. The pace of the Course was appropriate	□	□	□	□	□
10. Ideas and concepts were presented clearly	□	□	□	□	□
11. The method of assessment were reasonable	□	□	□	□	□
12. Feedback on assessment was timely	□	□	□	□	□
13. Feedback on assessment was helpful	□	□	□	□	□
14. I understood the lectures	□	□	□	□	□
15. The material was well organized and presented	□	□	□	□	□
16. The instructor was responsive to student needs and problems	□	□	□	□	□
17. Had the instructor been regular throughout the course?	□	□	□	□	□
18. The material in the tutorials was useful	□	□	□	□	□
19. I was happy with the amount of work needed for tutorials	□	□	□	□	□
20. The tutor dealt effectively with my problems	□	□	□	□	□

Survey when and why

- Evaluating to understand: good for reaching lots of people early on
- Evaluation of prototypes: typically used in combination with other methods
- Also called questionnaire

Benefits of survey

- Easy to collect data
- Do not require advanced tool for development
- Easily to get approval

Drawbacks of survey

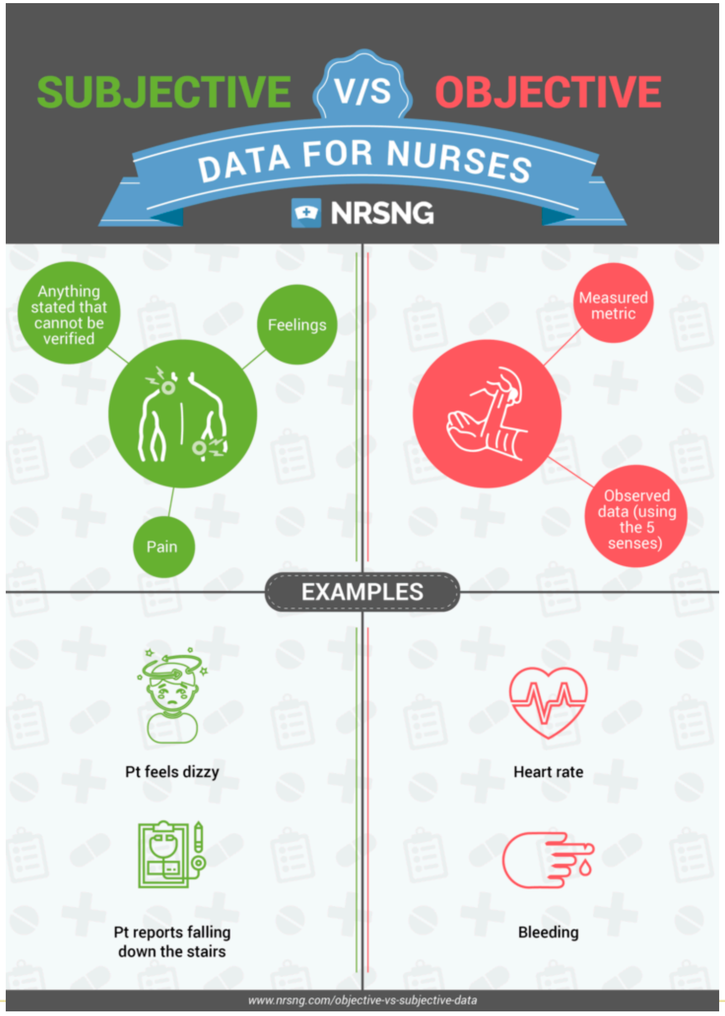
- Only get limited shallow data from users
- No interaction with users
- Lead to biased data
- Have low response rate and low quality response

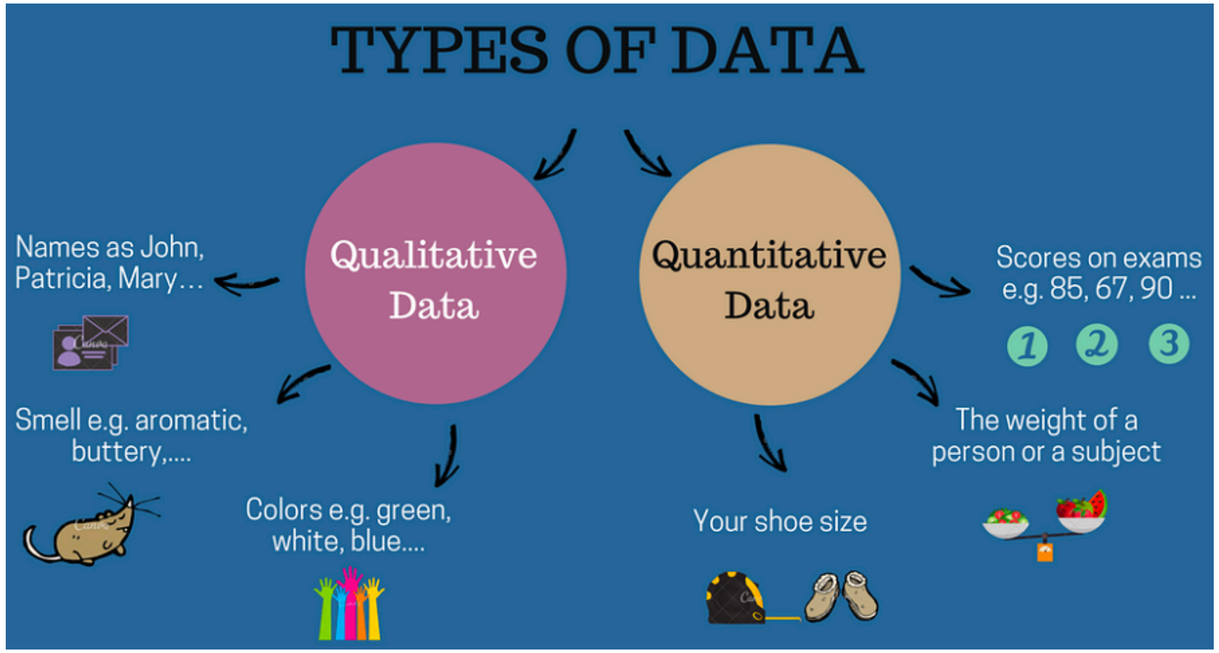
Goal and targeted user for survey

- Goal
  - Get responses from the target users
- Target users
  - Based on your applications and criteria

What kinds of data can you collect

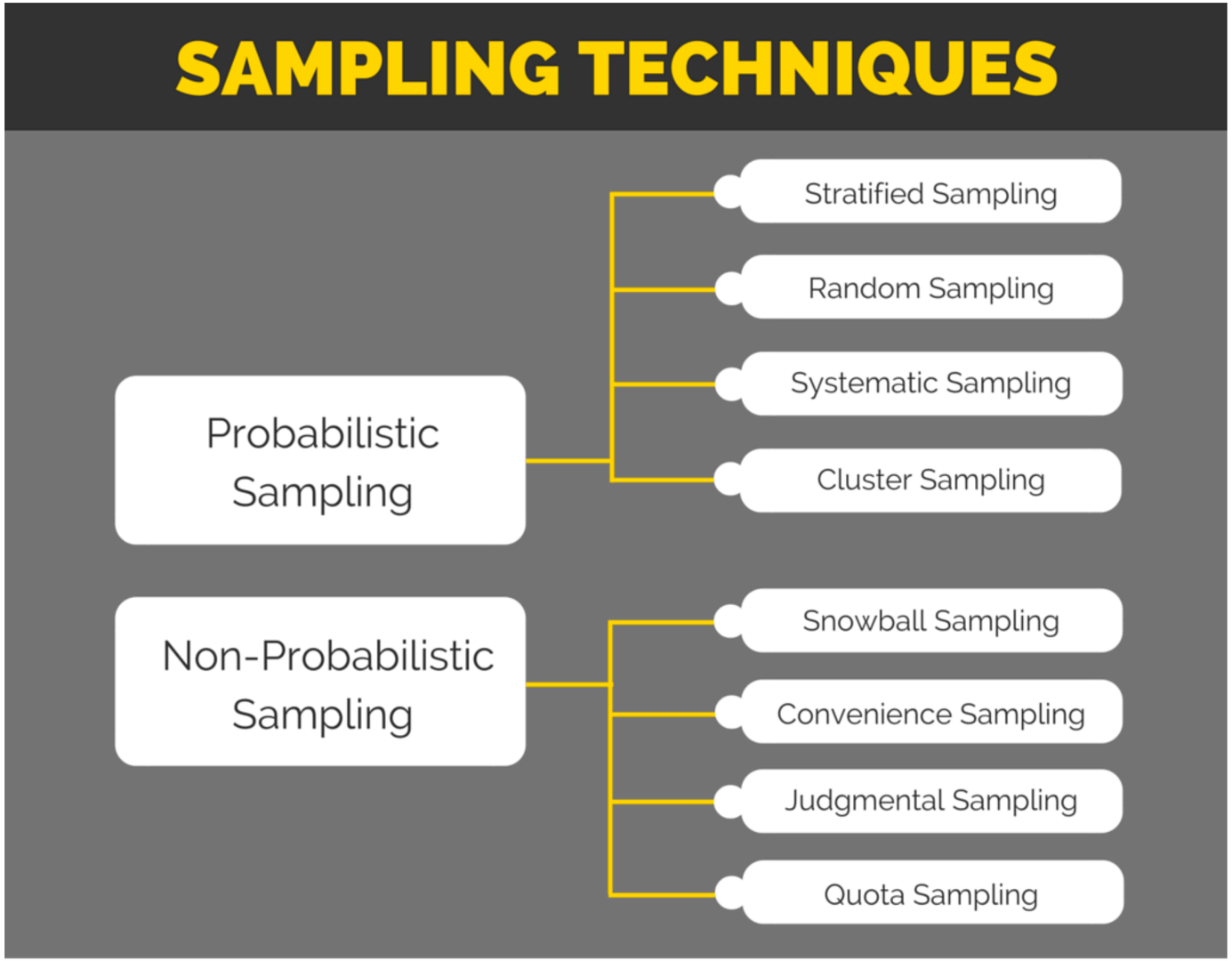
- Subjective and objective data
- Qualitative and quantitative data





Sampling

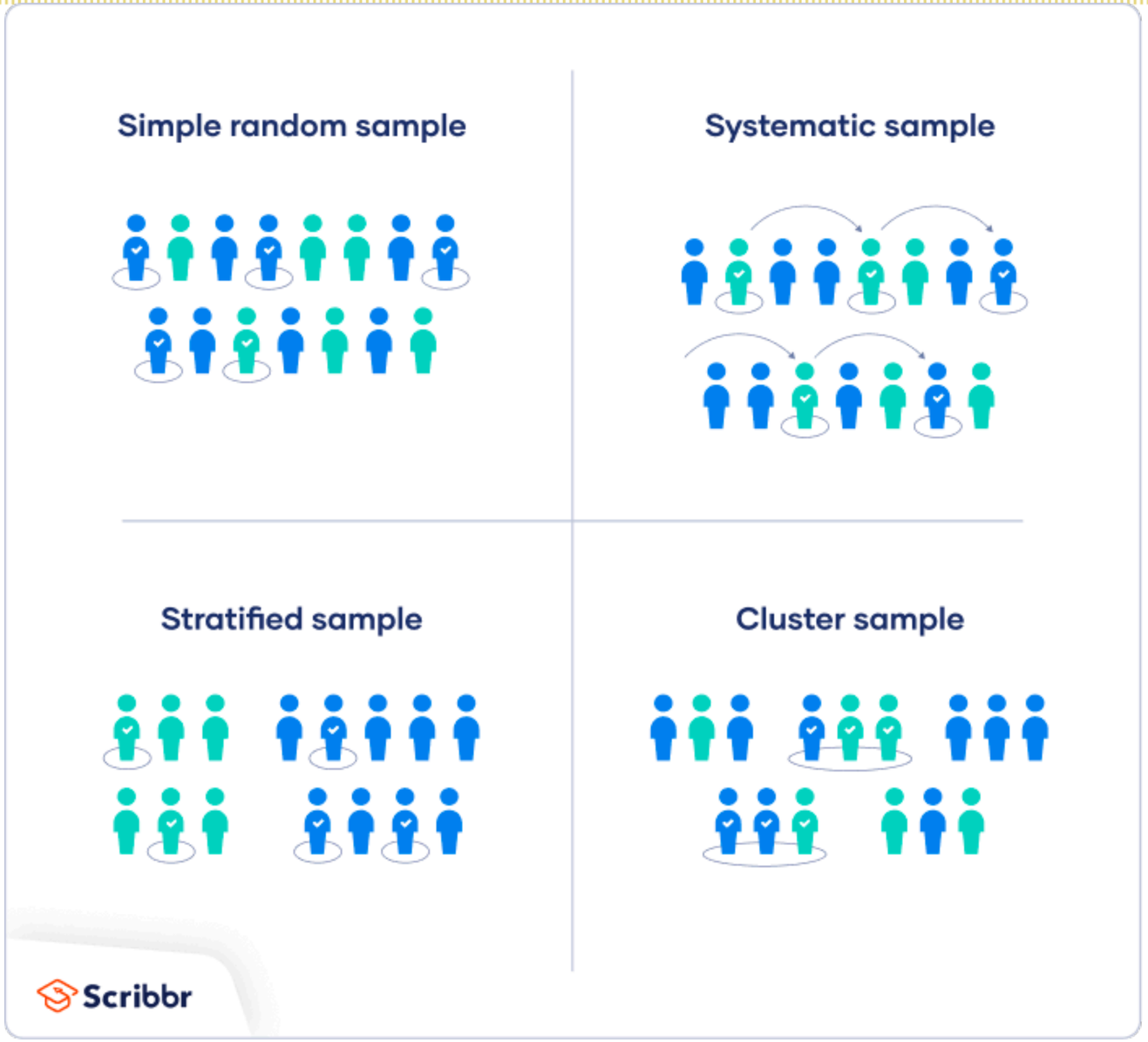
- Probabilistic sampling
- Non-probabilistic sampling



Probabilistic sampling

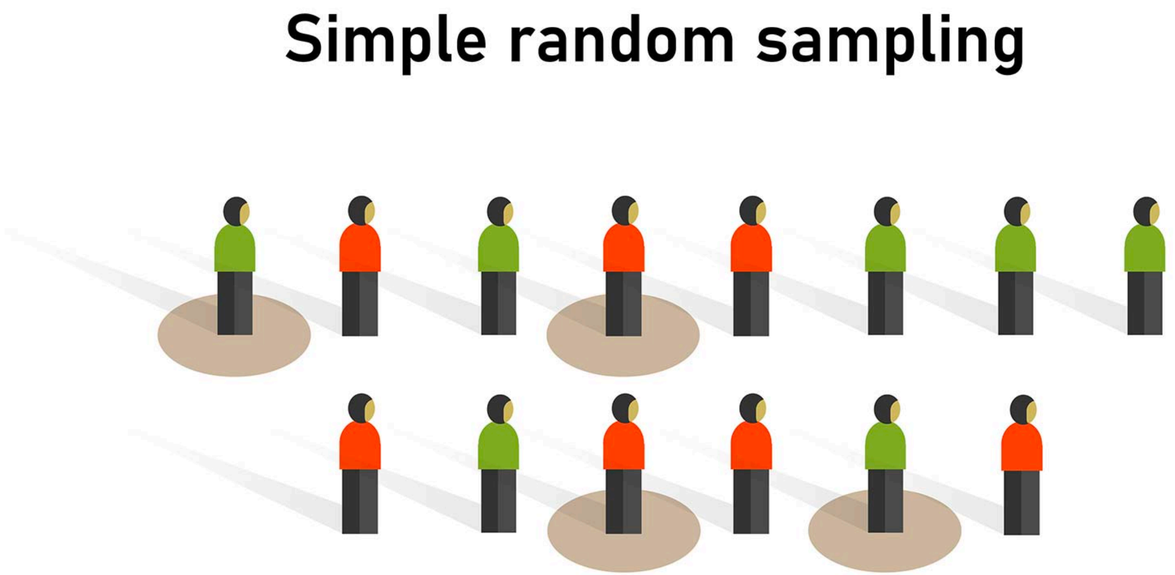
- Randomly select a subset from a sampling pool
- Need to meet the following criteria
  - Stratification
  - Response size
- Error
  - Coverage error (not all members have an equal chance to be selected)
  - Nonresponse error (major differences between the people who responded to a survey and the people who were sampled)

Probabilistic sampling



Probabilistic sampling

- Random sampling
  - An entirely random method of selecting the sample

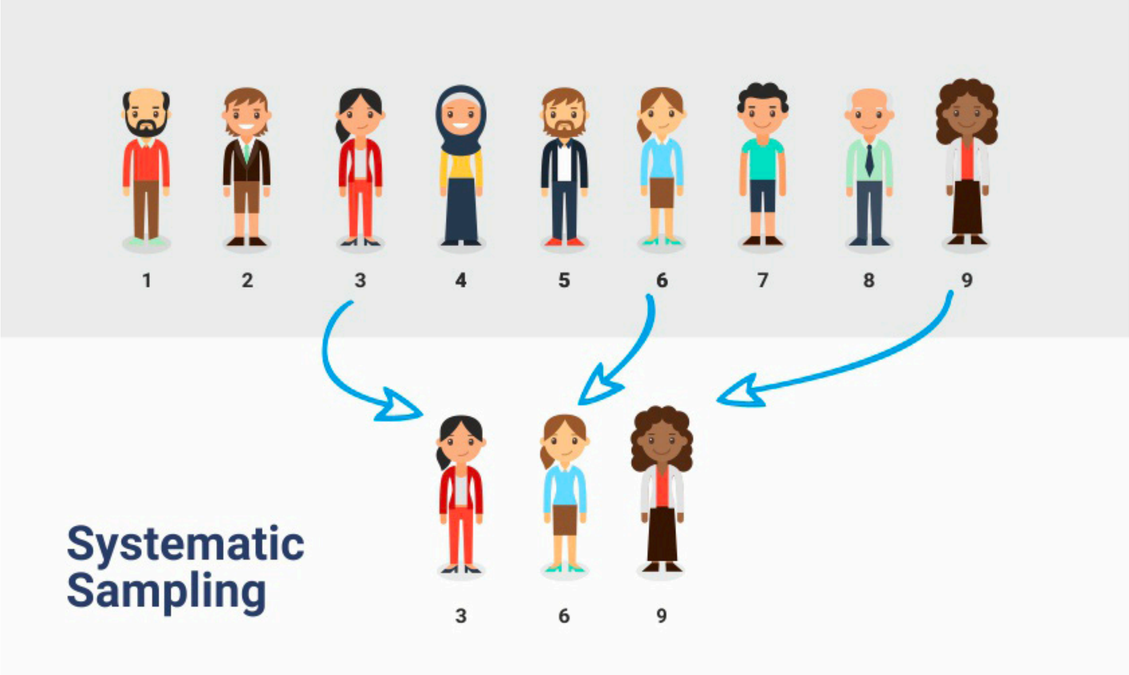


Probabilistic sampling

- Stratified sampling
  - Divide a more extensive population into smaller groups that usually don’t overlap but represent the entire population

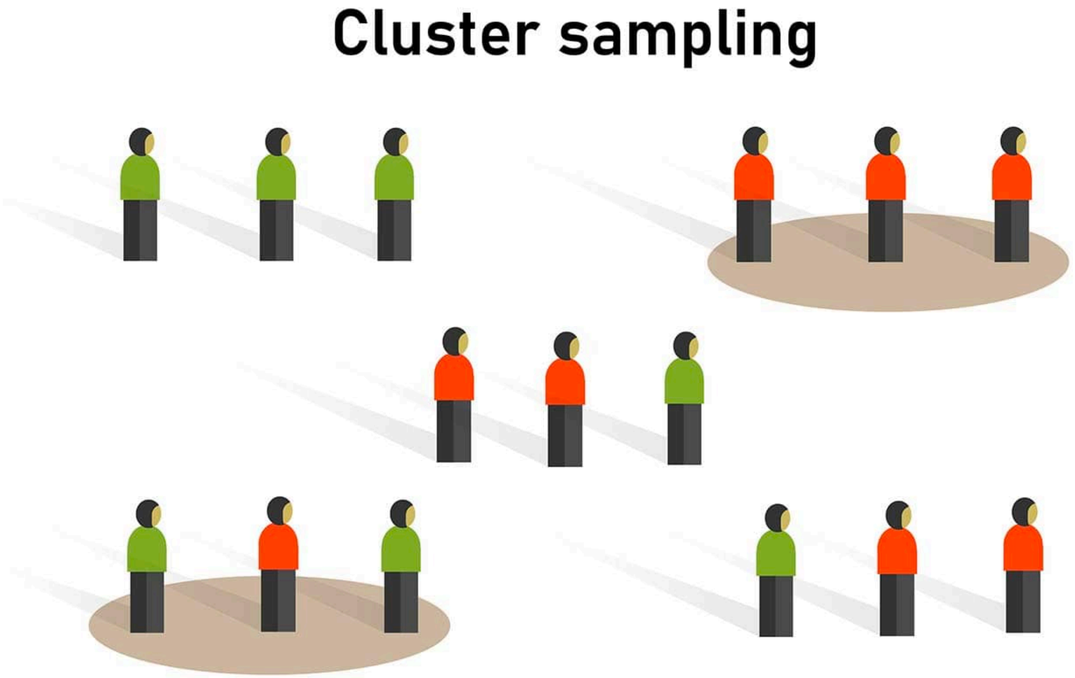
Probabilistic sampling

- Systematic sampling
  - Choose every “nth” individual to be a part of the sample. For example, you can select every 5th person to be in the sample



Probabilistic sampling

- Cluster sampling
  - Select participants randomly that are spread out geographically



Examples of probabilistic sampling

The population of the US alone is 330 million. It is practically impossible to send a survey to every individual to gather information. Use probability sampling to collect data, even if you collect it from a smaller population.

For example, an organization has 500,000 employees sitting at different geographic locations. The organization wishes to make certain amendments in its human resource policy, but before they roll out the change, they want to know if the employees will be happy with the change or not. However, reaching out to all 500,000 employees is a tedious task. This is where probability sampling comes handy. A sample from the larger population i.e., from 500,000 employees, is chosen. This sample will represent the population. Deploy a survey now to the sample.

Steps in probabilistic sampling

- Choose your population of interest carefully: Carefully think and choose from the population, people you believe whose opinions should be collected and then include them in the sample
- Determine a suitable sample frame: Your frame should consist of a sample from your population of interest and no one from outside to collect accurate data
- Select your sample and start your survey: It can sometimes be challenging to find the proper sample and determine a suitable sample frame. Even if all factors are in your favor, there still might be unforeseen issues like cost factor, quality of respondents, and quickness to respond. Getting a sample to respond accurately to a probability survey might be difficult but not impossible

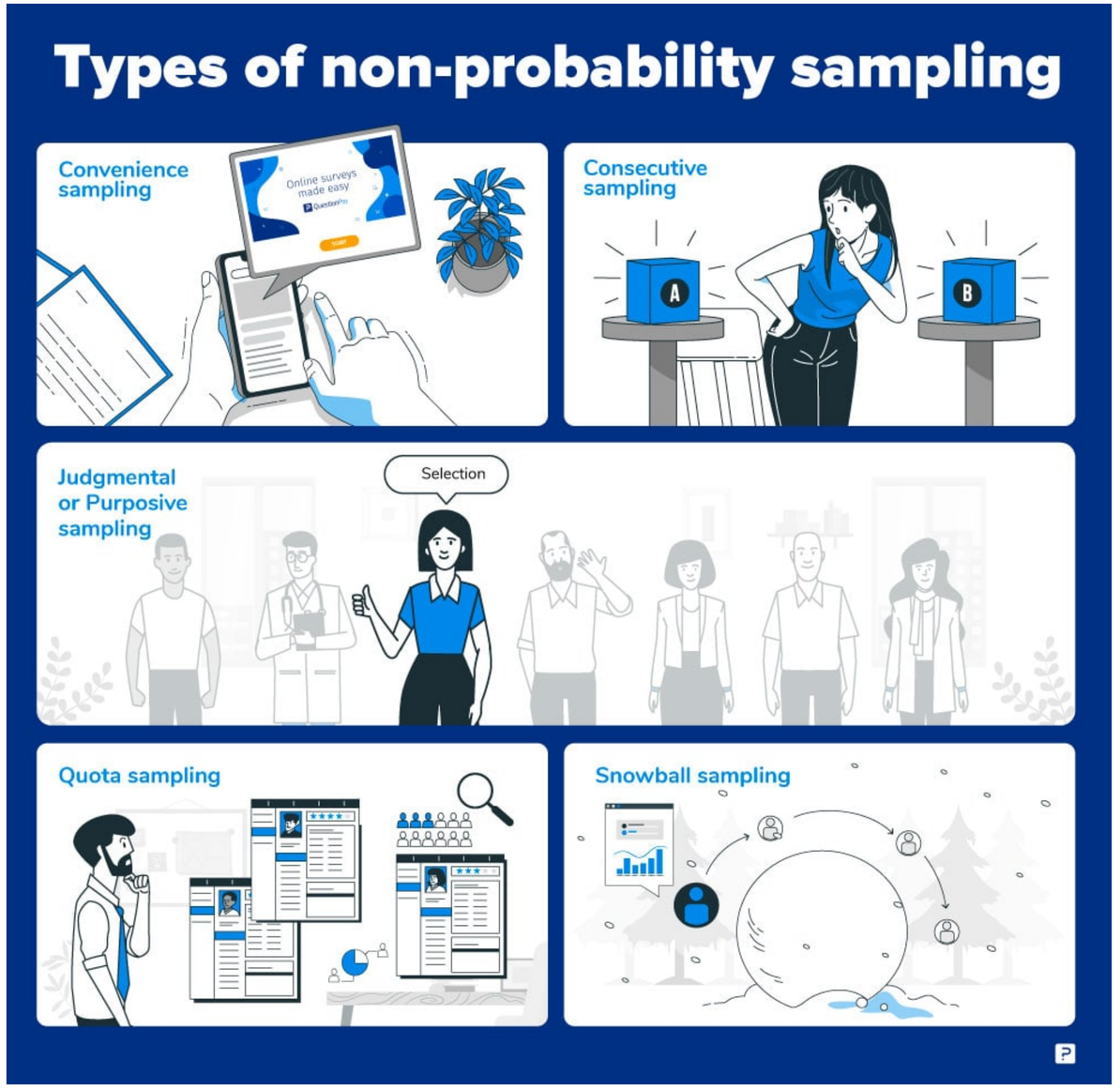
When to use probabilistic sampling

- When you want to reduce the sampling bias
- When the population is usually diverse
- To create an accurate sample

Non-probabilistic sampling

- Sampling where it is not possible to specify the probability that any person or other unit on which the survey is based will be included in the sample
- Advantages
  - Select samples purposively
  - Enable researchers to reach difficult-to-identify members of the population
- Disadvantages
  - Difficult to make valid inference about the entire population because the sample selected may not be representative

Non-probabilistic sampling



Non-probabilistic sampling

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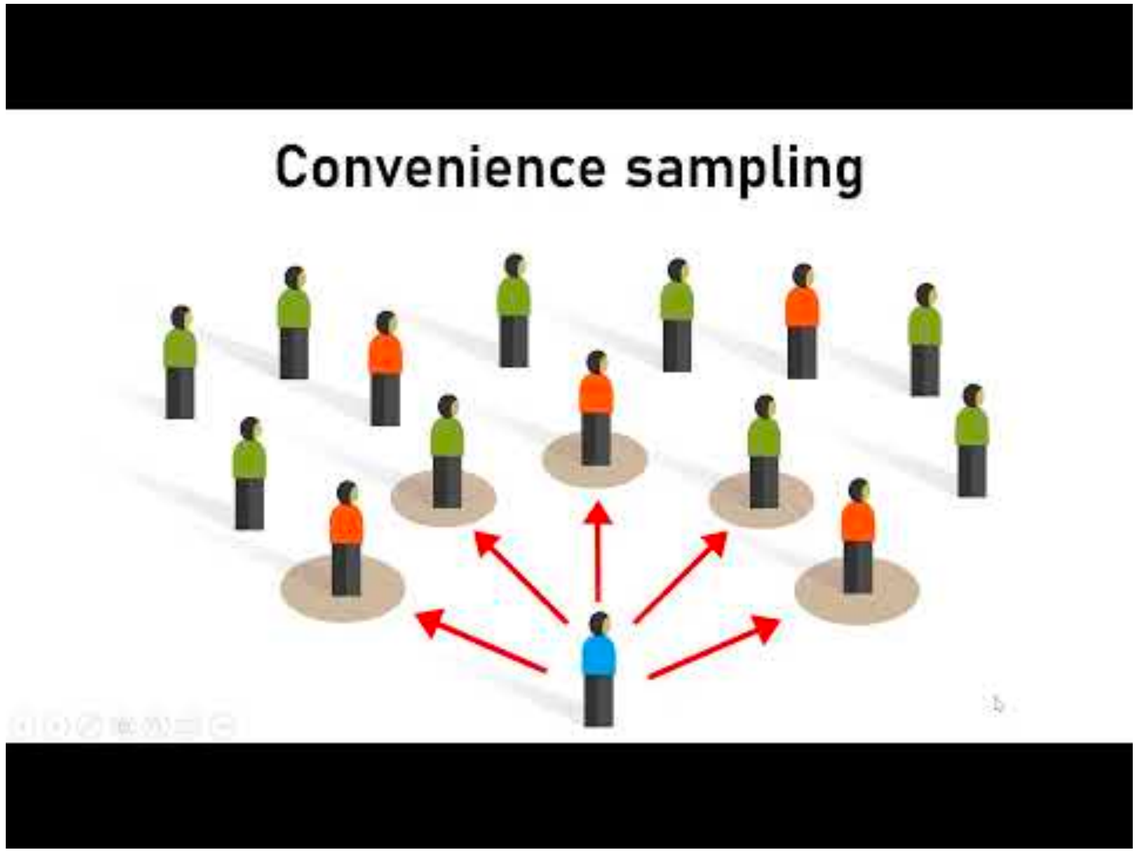
- Convenience sampling
  - Samples are selected from the population only because they are conveniently available to the researcher



Non-probabilistic sampling

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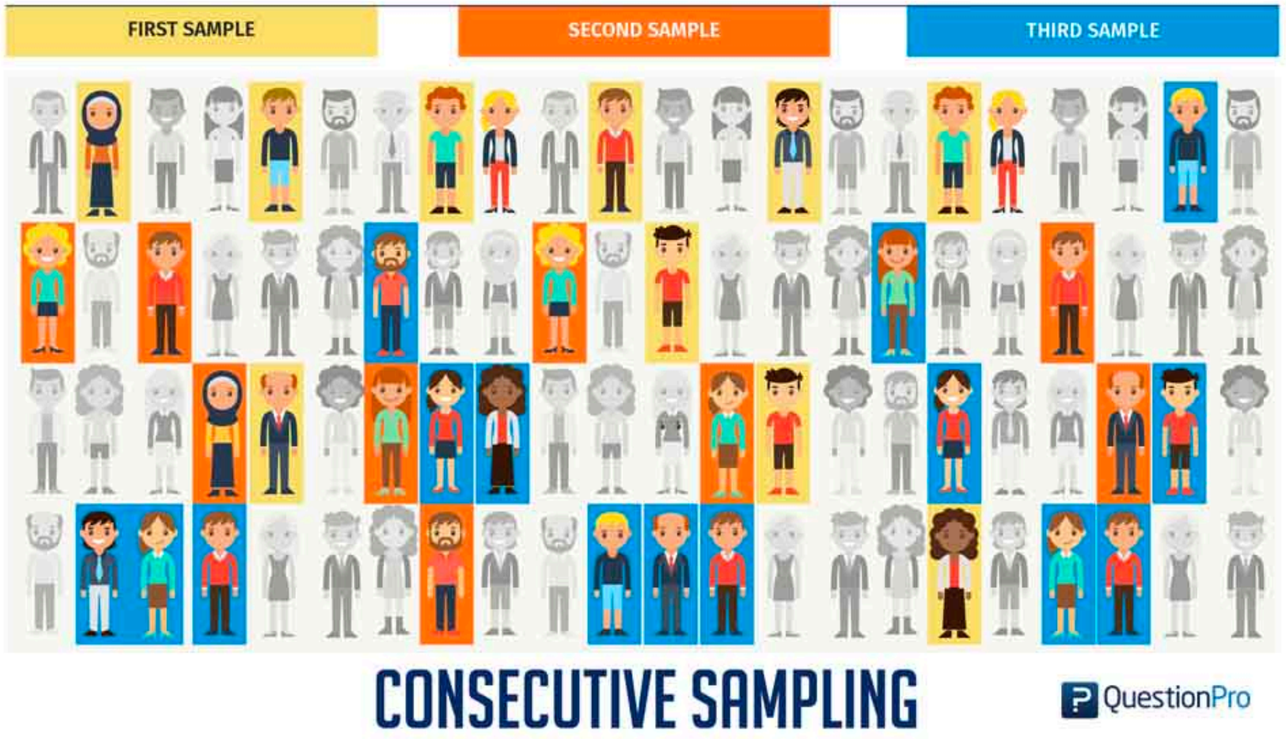
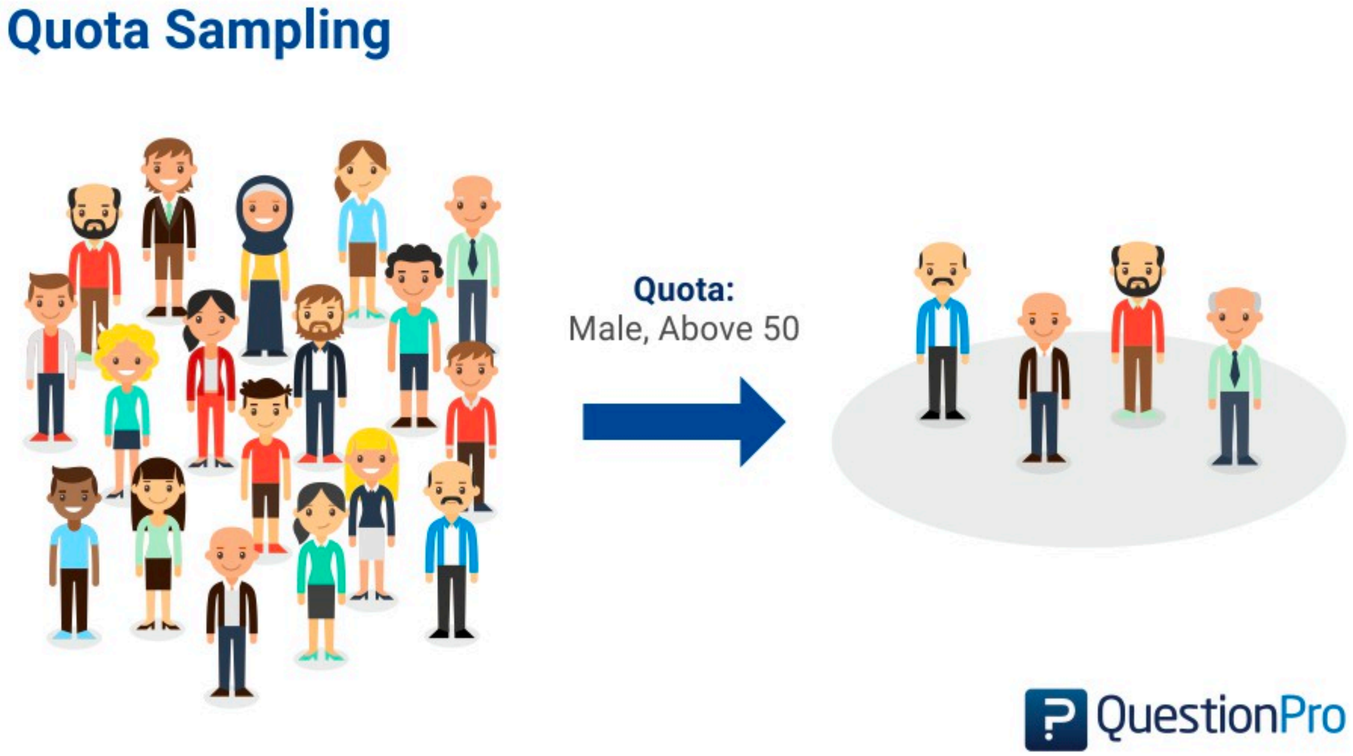
- Consecutive sampling
  - Pick a single person or a group of a sample, conducts research over a period, analyzes the results, and then moves on to another subject or group if needed



Non-probabilistic sampling

- Quota sampling
  - Create a sample involving individuals that represent a population



Non-probabilistic sampling

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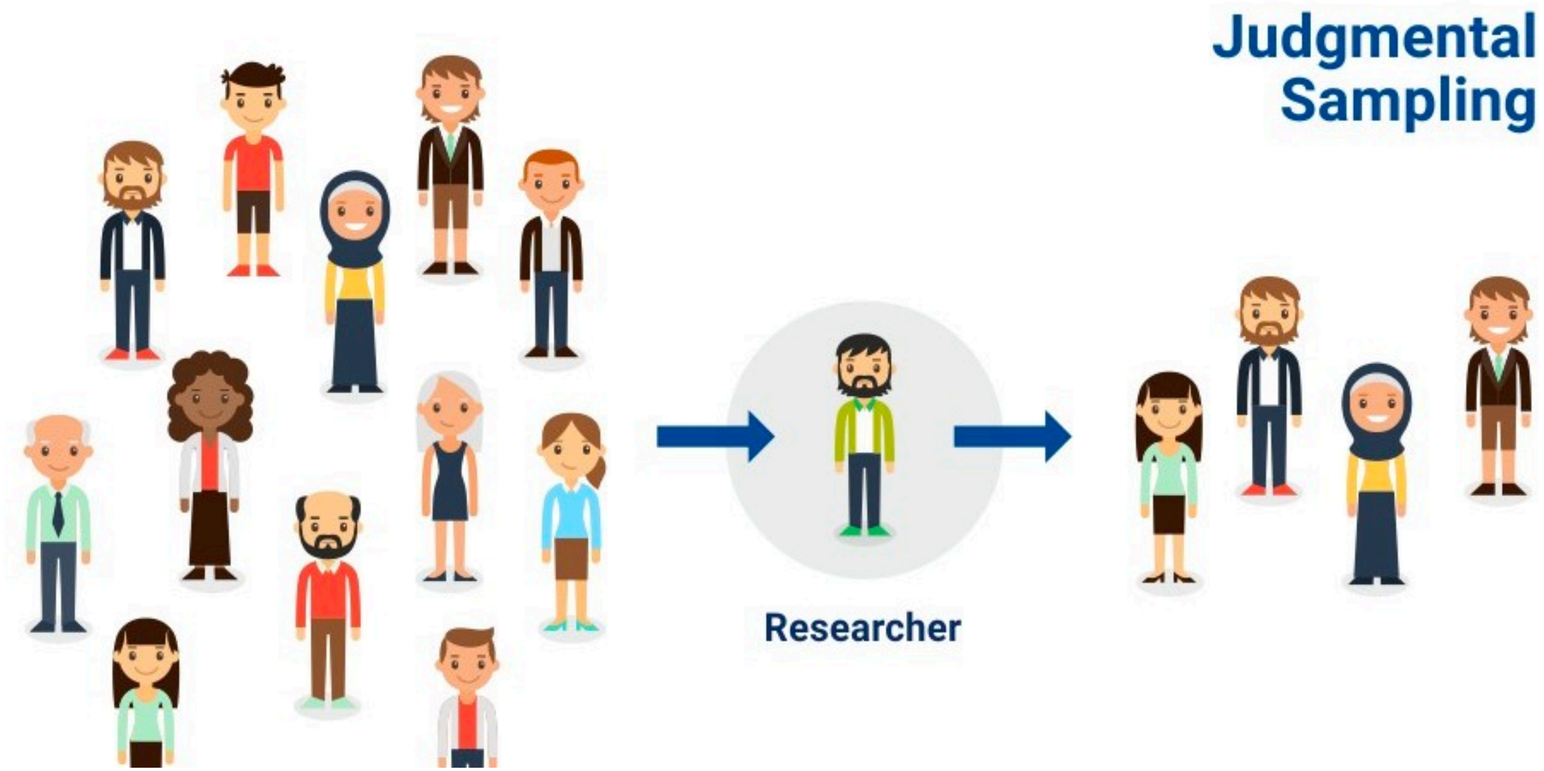
- Judgmental or purposive sampling
  - Select the samples based purely on the researcher's knowledge and credibility



Non-probabilistic sampling

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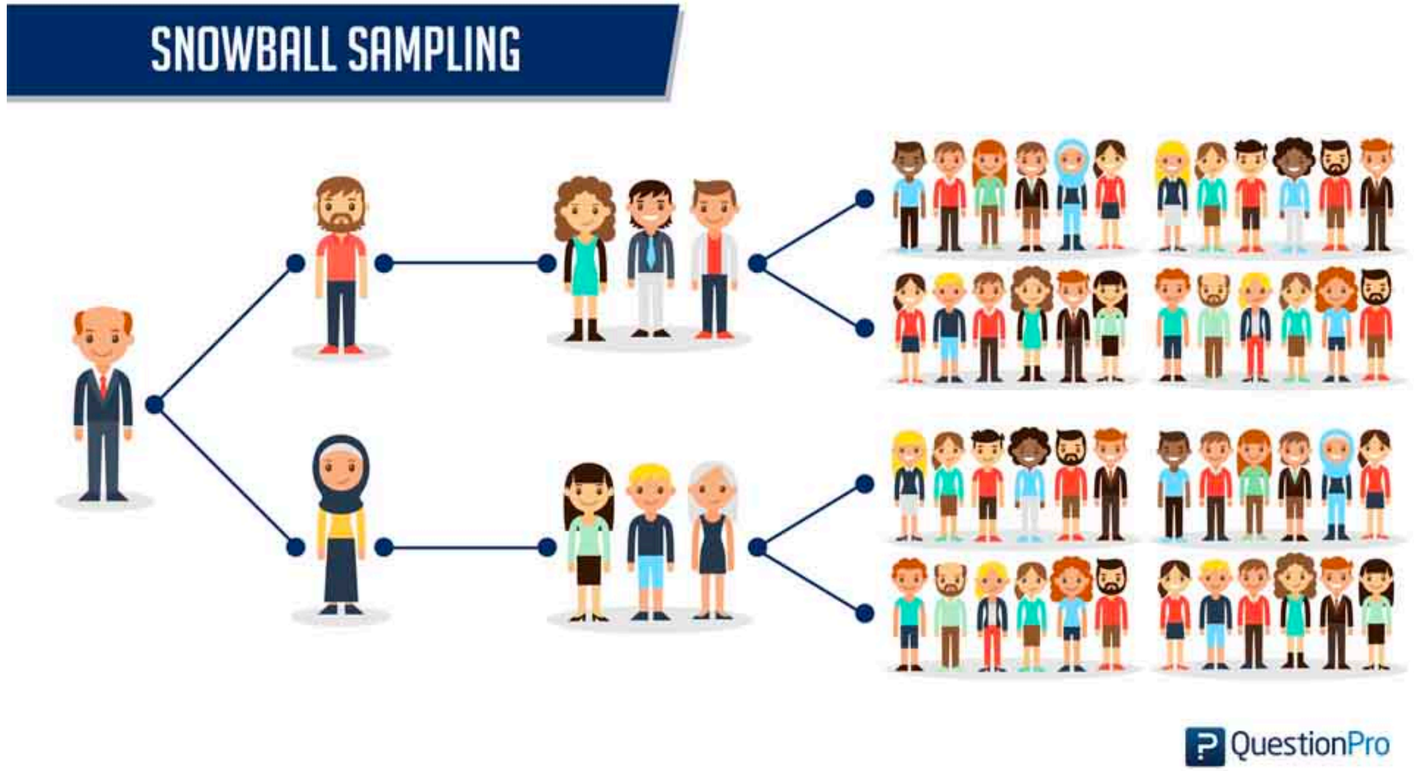
- Snowball sampling
  - Existing subjects provide referrals to recruit samples required for a research study



Examples of non-probabilistic sampling

An example of convenience sampling would be using student volunteers known to the researcher. Researchers can send the survey to students belonging to a particular school, college, or university, and act as a samples.

In an organization, for studying the career goals of 500 employees, technically, the sample selected should have proportionate numbers of males and females. Which means there should be 250 males and 250 females. Since this is unlikely, the researcher selects the groups or strata using quota sampling.

When to use non-probabilistic sampling

- Use this type of sampling to indicate if a particular trait or characteristic exists in a population
- Researchers widely use the non-probability sampling method when they aim at conducting qualitative research, pilot studies, or exploratory research
- Researchers use it when they have limited time to conduct research or have budget constraints
- When the researcher needs to observe whether a particular issue needs in-depth analysis, he applies this method.
- Use it when you do not intend to generate results that will generalize the entire population

Probabilistic vs. non-probabilistic

Probability sampling	Non-probability sampling
The samples are randomly selected.	Samples are selected on the basis of the researcher's subjective judgment.
Everyone in the population has an equal chance of getting selected.	Not everyone has an equal chance to participate.
Researchers use this technique when they want to keep a tab on sampling bias.	Sampling bias is not a concern for the researcher.
Useful in an environment having a diverse population.	Useful in an environment that shares similar traits.
Used when the researcher wants to create accurate samples.	This method does not help in representing the population accurately.
Finding the correct audience is not simple.	Finding an audience is very simple.

Developing open-ended questions

- Get a better understanding of phenomena due to the complete flexibility
- Lead to responses that either do not really help researchers address the root question, or responses that simply do not provide enough information
- Ask for opinions
- Good for general subjective information

Can you suggest any improvements to the interface?

Designing open-ended questions

- Be specific
- Be easy to use and complete

Why did you stop using the Banjee Software product?

How did you feel about the usability (ease of use) of the Banjee software?

Did the Banjee software allow you to complete the tasks that you wanted to complete?

What barriers did you face, in attempting to use the Banjee software to complete your tasks?

Developing close-ended questions

- Ordered response categories
- A number of choices is given
- Unordered response categories
- Not have a logical order
- Hard to interpret if questions are not designed well

Figure 4.4 Example of a partially closed question format.

Which of the following is your favorite college women's sport?

- ☐ Basketball
- ☐ Gymnastics
- ☐ Soccer
- ☐ Softball
- ☐ Swimming
- ☐ Tennis
- ☐ Volleyball
- ☐ Other: Please specify ____

Unordered

What is your impression of using the website for www.veggieworld.com?

Please circle one number

Frustrating Satisfying

1 2 3 4 5 6 7 8 9

Ordered

Designing close-ended questions

- For web-based survey, consider the different interface widgets when providing multiple-choice questions
- Distinguish the single and multiple choices (e.g., option buttons for one choice and checkboxes for multiple choices)

Combining open-ended and closed questions

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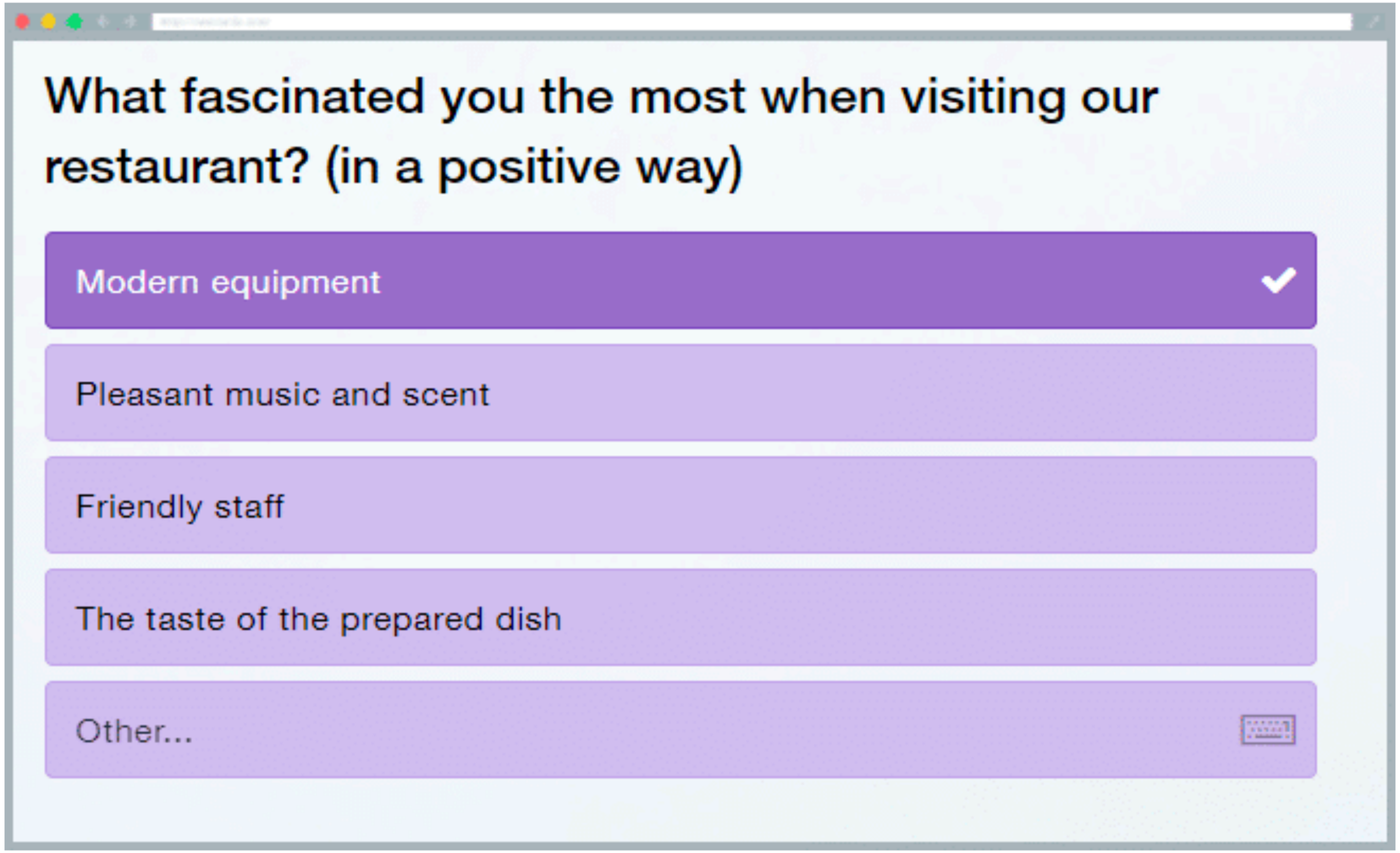
- Get specific response, but allows room for user's opinion



Common problems with survey questions

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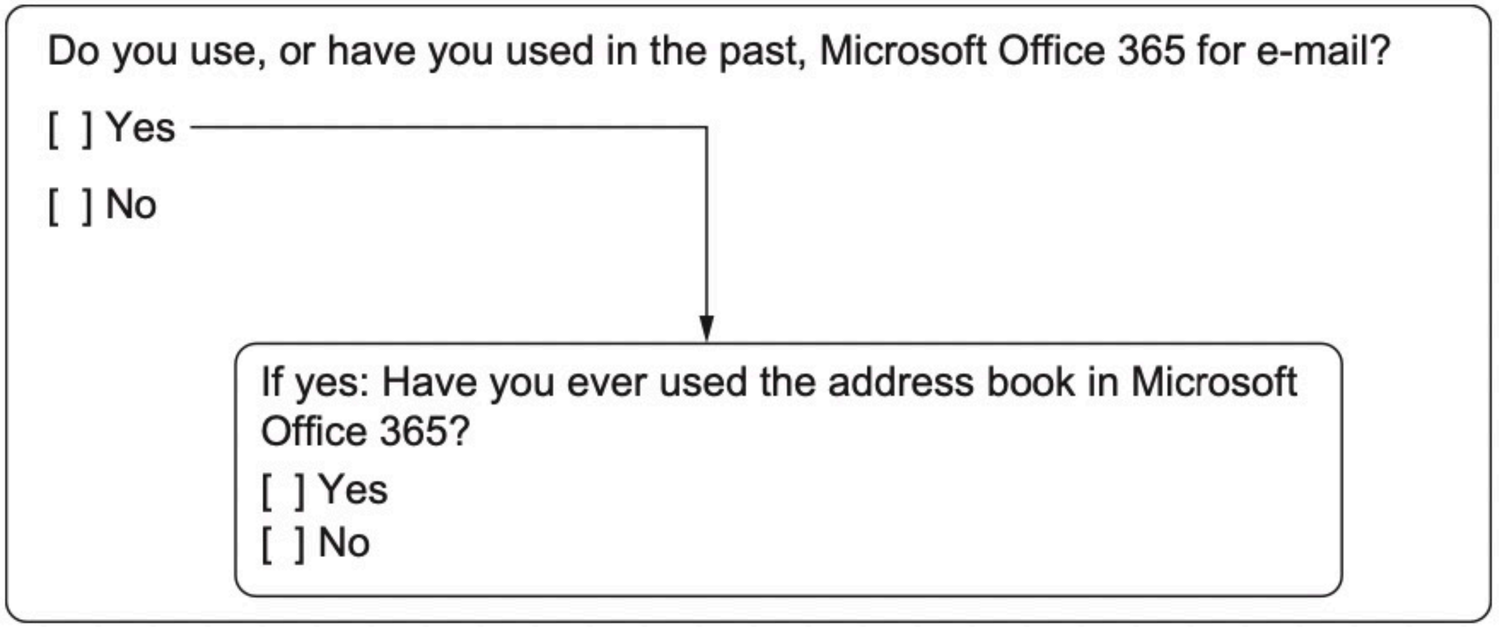
- A “double-barreled question” asks two separate, and possibly related questions (e.g., “How long have you used the Word processing software and which advanced features have you used?”). These questions need to be separated.
- The use of negative words in questions (e.g., “Do you agree that the e-mail software is not easy to use?”) can cause confusion for the respondents.
- Biased wording in questions (such as starting a sentence with “Don't you agree that ...”) can lead to biased responses. If a question begins by identifying the position of a well-respected person or organization (e.g., “Oprah Winfrey [or David Beckham] takes the view that ...”), this may also lead to a biased response.
- “Hot-button” words, such as “liberal,” “conservative,” “abortion,” and “terrorism,” can lead to biased responses.

Designing a survey

- Establish the purpose of the survey
- What information is sought
- How would you analyze the results
- What would you do with your analysis
- Determine the audience you want to reach
- Typical when using survey for understanding
- Test everything before sending it out
- Test the wording
- Test the timing
- Test validity
- Test the analysis

Overall survey structure

- Begin with instructions
- Organize the layout of the survey
- Place the questions smartly
- Limit the survey length



A contingent question

Designing good questions

- Extra important to get questions right
- A few general guidelines
  - Be specific and clear about how users should answer
  - Keep questions short and easy to follow
  - Avoid double and triple-barreled questions
  - Avoid ambiguity and too much room for interpretation
  - Avoid biasing responses as much as possible

Validity

- Are your questions getting at what you want
- Can increase validity by
  - Piloting (see how people answer)
  - Triangulation (target hypotheses with multiple questions)
  - Use previously validated surveys (studied extensively to confirm they gather what they intend to gather)

Tradeoffs

- Surveys are limited by length and complexity
  - Can not always ask about everything you want to
- Try to focus questions on what you really want to learn
  - A few focused questions more useful than many general ones
  - If the answer is obvious don't need to ask it
- Be careful of focusing too much on what you expcet to the exclusion of other explanations

Paper and online survey

- Paper survey
  - can be used for a majority of individuals
  - not friendly to disable people
- Online survey (e.g., web and email)
  - Automatically cut out any potential individuals who do not have access to computer
  - Provide a usable interface
  - Low cost
  - Eliminate the need for time-consuming data entry and many data entry errors

Pilot testing

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- Guarantee that the questions are clear and unambiguous
- Complete as a three-stage process
  - Review of the survey tool by knowledgeable colleagues and analysts
  - Interviews with potential respondents to evaluate cognitive and motivational qualities in the survey tool.
  - Pilot study of both the survey tool and implementation procedures

Increase response rate

- Send a precontact letter (usually with information from a trusted authority, as stated earlier), before the actual mailing
- Send a postal mailing, which includes the actual survey
- Send a thank you postcard (which thanks people for their time and serves as a reminder)
- Send a replacement survey to nonrespondents 2–4 weeks after the original one was sent
- Make a final contact using a different mode. If the original survey was sent using postal mail, then maybe a phone call or e-mail should be used. If the survey was electronic, maybe a postal letter or phone call should be used. The idea is to have a different delivery method for the final contact that gets the attention of the respondent.

Be considerate of your respondents

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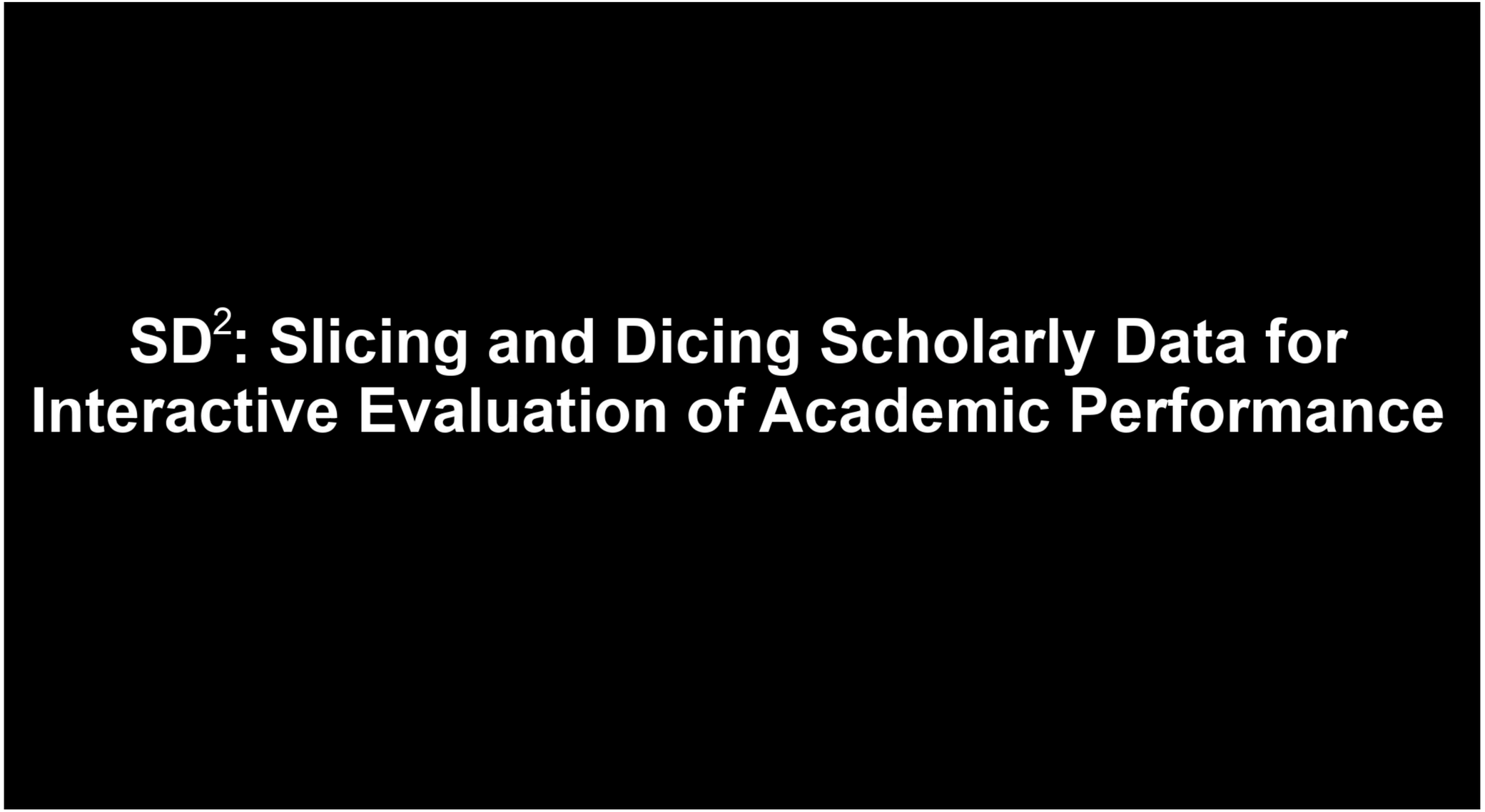
- Survey length (short is good)
  - Think in terms of reasonable completion times
  - Do not ask questions whose answers you will not use
- Privacy invasion and anonymity
  - Be careful how and what you ask
- Motivation
  - Why should the respondent bother
  - Usually need to offer something in return
- Ability
  - Limitations like literacy and disability can come into play

Case study



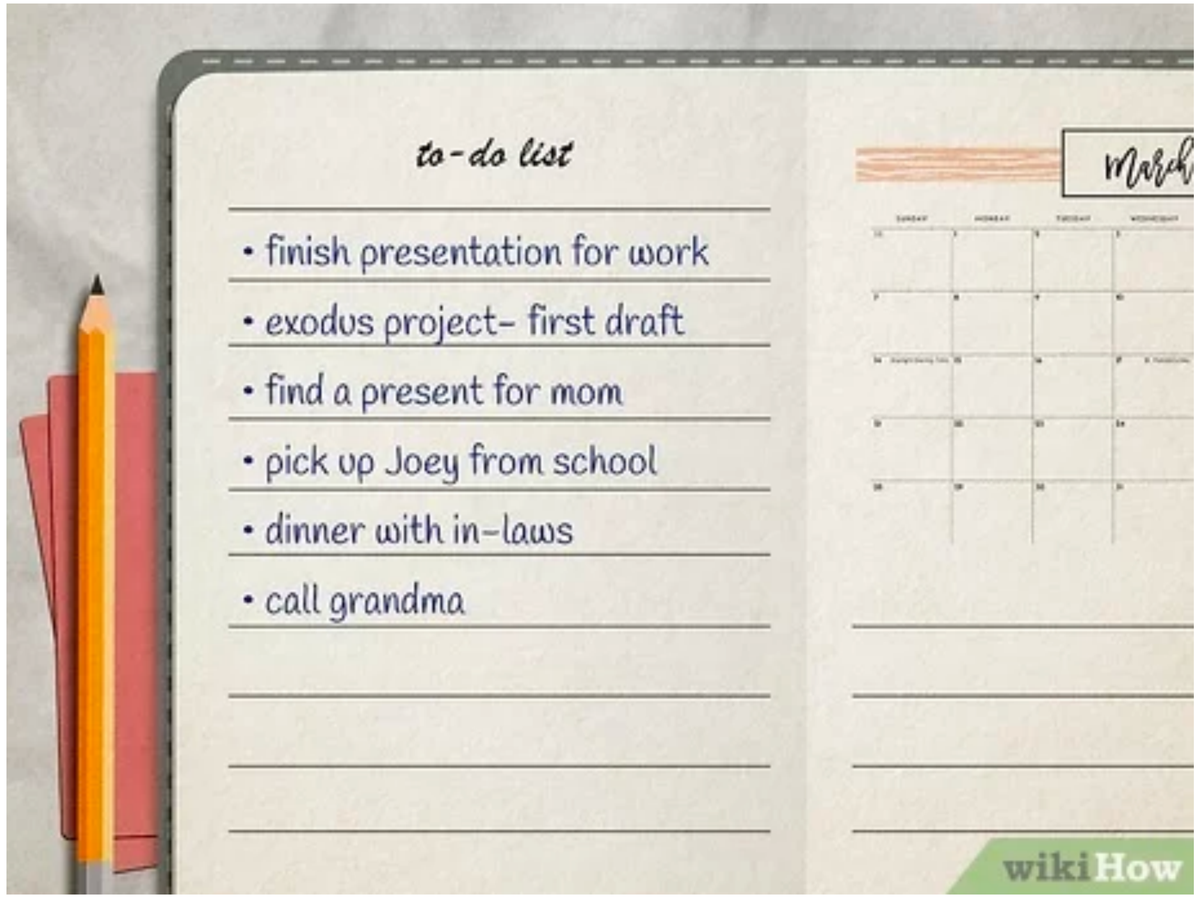
Guo et al. TVCG, 2022.

Outline

- Survey
- Diary

Diary

- A document created by an individual who maintains regular recordings about events in their life, at the time that those events occur



Time diary

- Focuses on how individuals utilize their time in different activities
- Prevailing type in human-computer interaction since HCI focuses on how long we spend in some software application, how much time we spend on a website, etc.

Frustrating Experience

Please fill out this form for each frustrating experience that you encounter while using your computer during the reporting session. This should include both major problems such as computer or application crashes, and minor issues such as a program not responding the way that you need it to. Anything which frustrates you should be recorded.

1. What were you trying to do?
2. On a scale of 1 (not very important) to 9 (very important), how important was this task to you?

   Not very important 1 2 3 4 5 6 7 8 9 Very Important
3. What software or program did the problem occur in? If the problem was the computer system, please check the program that you were using when it occurred (check all that apply).

Advantages of diaries

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- Good for understanding how individuals utilize technology in nonworkplace, noncontrolled, or on-the-go settings
- Good for understanding the “why” of user interaction with a technology or any technology phenomenon
- More accurate time recording than in a survey
- Good for collecting data that is fluid, and changes over time (such as time, mood, perception, or response)
- The limited gap between an event happening and it being recorded can help limit the impact of individual personality on interpretation of what occurred
- Good for collecting user-defined data (e.g., when a user intended to perform an action but did not do so)

Disadvantages of diaries

- Participants are sometimes not introspective and not aware of the specifics of what they are doing; they may therefore have trouble recording it in a diary entry
- Participants may not follow through and record a sufficient number of entries
- Time recording may be less accurate than in a controlled laboratory setting or automated data collection
- Generally harder to recruit participants for a diary study than for a less intrusive study, such as a survey
- Since data is both qualitative and quantitative, data analysis may take a long time
- Hard to strike a balance between a frequent-enough series of diary entries and infringement on daily activities (user participation may then trail off)

Participants for a diary

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- An understanding of the purposes of maintaining the diary
- The motivation to keep a regular and accurate record
- Competence in using the technology that is the subject of the diary and the method used to record the diary

Types of diaries

- Feedback
  - The data from the diary itself provides the feedback
  - Focus on the events that interest the researcher
  - The uncertainty on how often a diary entry is made
- Elicitation
  - The data recorded in the diary is used for prompting
  - Focus on the events that interest the user
  - Record only basic information about the important events occurring

Thank Prof. Narges Mahyar for many of the slides!