User interface design

Week8: Data collection: key issues, Data recordings, interviews, Questionnaires, observations

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outline

- Intended learning outcomes
- Six key issues
- Capturing Data
- Interviews
- Questionnaires
- Observation

Intended learning outcomes

- Students should be able to discuss how to plan and run successful data gathering sessions.
- Should be able to plan and run an interview.
- Should be able to design a simple questionnaire.
- Should be able to plan and carry out an observation.

Introduction

- Data is everywhere. Indeed, it is common to hear people say that we are sinking in data because there is so much of it.
- Data can be numbers, words, measurements, descriptions, comments, photos, sketches, films, videos, or almost anything that is useful for understanding a particular design, stakeholders' goals, and people's behavior.
- Data can be quantitative or qualitative e.g. the time it takes someone to find information on a web page and the number of clicks to get to the information is quantitative data.

- What someone says about the web page is a form of qualitative data.
- But what does it mean to collect these and other kinds of data?
- What techniques can be used, and how useful and reliable is the data that is collected?
- In particular, data gathering is a central part of discovering requirements and evaluation.
- Within the requirements activity, data gathering is conducted to collect enough information so that design can proceed.

- Three main techniques for gathering data are: interviews, questionnaires, and observation.
- All three techniques may be used to collect qualitative or quantitative data.

Six key issues

- Six key issues require attention for any data gathering session to be successful:
- Goal setting,
- Identifying participants,
- The relationship between the data collector and the data provider,
- Ethical considerations of collecting data,
- Triangulation
- Pilot studies.

Setting Goals

- Goal setting is a crucial step that helps define the purpose and objectives of your data collection efforts.
- Clear and well-defined goals guide your data collection process, ensuring that you gather the right information to meet your research, business, or decision-making needs.
- The main reason for gathering data is to collect information about people, their behavior, or their reaction to technology.

❖Setting specific goals for the study will inform the nature of data gathering sessions, the data gathering techniques to be used, and the analysis to be performed.

To set effective goals for data gathering, designers should consider the following:

❖What is the purpose of the data gathering? What questions are you trying to answer?

❖What hypotheses are you trying to test?

❖What type of data do you need to collect? Quantitative? Qualitative? Both?

- Who is your target population? Who do you need to collect data from?
- What resources do you have available? Time? Budget? Personnel?
- Whatever the format, goals for data gathering should be sufficiently well-defined so that it is clear when the goal has been met.
- How to recognize when a goal has been met will vary according to the technique used.

Identifying Participants

- The goals developed for the data gathering session will indicate the types of people from whom data is to be gathered.
- Those people who fit this profile are called the population or study population.
- Identifying participants in data gathering is an important step in the research process. It is important to identify the right participants in order to collect data that is relevant and useful to your research.

The best method for identifying participants in data gathering will depend on the specific research project.

There are a number of different ways to identify participants in data gathering. Some common methods include:

- **Convenience sampling**: This involves selecting participants who are easily accessible to the researcher. For example, a researcher might recruit participants from their own university or workplace.
- **Probability sampling**: This involves selecting participants using a random method. This ensures that the sample is representative of the population of interest.

- **Purposive sampling**: This involves selecting participants based on specific criteria. For example, a researcher might recruit participants who have a certain medical condition or who have experienced a particular event.
- **Snowball sampling**: This involves asking initial participants to refer other potential participants. This method can be useful for recruiting participants who are difficult to find.

Relationship with Participants

- One significant aspect of any data gathering is the relationship between those doing the gathering and those providing the data.
- A good relationship between the data collector and the data provider is essential for ensuring the quality of the data collected.
- When the data collector and the data provider have a good relationship, they are more likely to trust each other and to be open and honest with each other.
- This can lead to more accurate and complete data collection.

There are a number of things that data collectors and data providers can do to foster a good relationship:

- Be clear about the purpose of the data collection. The data collector should explain to the data provider why they are collecting the data and how it will be used.
- Be respectful of the data provider's time and resources. The data collector should be mindful of the burden that data collection can place on the data provider.

- Be transparent about the data collection process. The data collector should explain to the data provider how the data will be collected and stored.
- Protect the data provider's privacy. The data collector should take steps to protect the data provider's privacy. This includes keeping the data confidential and only using the data for the purposes that were explained to the data provider.

Ethical Considerations of Data Collection and Storage

- In addition to informed consent to take part in the study, there are various issues relating to data collection and storage that have ethical implications.
- Collecting data, whether for research, business, or other purposes, must be conducted with careful attention to ethical considerations.
- Ethical data collection is essential to protect individuals' rights, ensure data integrity, and maintain trust with participants and the public.

There are a number of ethical considerations that must be taken into account when collecting data. These considerations include:

- **Informed consent**: Participants should be fully informed about the purpose of the data collection, how their data will be used, and the potential risks and benefits of participating.
- **Confidentiality**: Data collectors should take steps to protect the confidentiality of participants' data by keeping the data secure and only using it for the purposes that were explained to the participants.

- **Anonymity**: If possible, data collectors should collect data anonymously. This means that the participants' identities should not be linked to their data.
- **Bias**: Data collectors should be aware of the potential for bias in their data collection and take steps to mitigate it through random sampling method and being mindful of their own biases.
- **Harm**: Data collectors should avoid causing any harm to participants. This includes both physical harm and psychological harm.

Triangulation

- Triangulation is a term used to refer to the investigation of a phenomenon from (at least) two different perspectives.
- This can help to strengthen the validity and reliability of the research findings.
- Triangulation can be used at any stage of the research process, from planning to data collection to analysis and interpretation.
- It can also be used to address specific research questions or concerns.

There are different types of triangulation, including:

- **Data source triangulation**: This involves using multiple data sources, such as surveys, interviews, and documents.
- **Method triangulation**: This involves using multiple data collection methods, such as quantitative and qualitative methods.
- **Investigator triangulation**: This involves having multiple researchers collect and analyze the data.

Pilot Studies

- A pilot study is intended to test elements of the main study to identify potential problems in advance so that they can be corrected.
- A pilot study is a small-scale study that is conducted before a larger study.
- Pilot studies are often used to test the feasibility of a research design, to identify and address any potential problems, and to collect preliminary data.

- Pilot studies can be particularly useful for data gathering.
- By conducting a pilot study, researchers can:
- Test the data collection instruments and methods to make sure that they are working properly.
- Identify any potential problems with the data collection process, such as unclear questions or instructions.
- Collect preliminary data that can be used to refine the research design and data collection methods for the larger study.

Capturing Data

- Some forms of data gathering, such as questionnaires, diaries, interaction logging, scraping, and collecting work artifacts, are self-documenting, and no further capturing is necessary.
- The most common of these are taking notes, photographs, recording audio, and recording video.
- Capturing data is easy as recording devices are light and cheap, and digital technologies saturate every human activity.

Common data recording approaches

- **Notes Plus Photographs**
- Is a qualitative research method that combines written notes with photographs to capture rich and detailed information about a particular phenomenon or experience.
- This approach is particularly well-suited for capturing data that is difficult to quantify or measure, such as people's thoughts, feelings, and experiences.

- Researchers take written notes while observing or interviewing participants. Such notes can be used to record factual information.
- In addition to taking notes, researchers also take photographs of relevant objects, people, or places.
- These photographs can be used to supplement the written notes and provide a more complete record of the research experience.

❖**Audio Plus Photographs**

❖Is a qualitative research method that combines audio recordings with photographs to capture rich and detailed information about a particular phenomenon or experience.

❖This approach is particularly well-suited for capturing data that is difficult to quantify or measure, such as people's thoughts, feelings, and experiences.

- Researchers record audio of participants' conversations, interviews, or other interactions. Such recordings can be used to capture the nuances of participants' speech, as well as their tone of voice and nonverbal cues.
- In addition to recording audio, researchers also take photographs of relevant objects, people, or places.
- These photographs can be used to supplement the audio recordings and provide a more complete record of the research experience.

Video

- Is a qualitative research method that uses video cameras to capture data about human behavior and interactions.
- This approach is particularly well-suited for capturing data that is difficult to quantify or measure, such as nonverbal cues, body language, and social dynamics.
- In the video data recording approach, researchers use video cameras to record participants' interactions in a natural setting.

Interviews

- Interviews are a qualitative data collection method that involves asking questions in order to collect data.
- Interviews are a particularly useful data collection method when you want to learn more about people's complex thoughts and feelings.
- They can also be used to collect data from people who are difficult to reach through other methods, such as surveys.
- Interviews can be conducted in person, over the phone, or online.

Unstructured Interviews

- These are types of interview in which the interviewer does not have a predetermined set of questions. Instead, the interviewer asks open-ended questions and follows up on the participant's responses.
- They can also be used to gather data on sensitive topics, where participants may be more comfortable talking about their experiences in a more open-ended way.

Examples of unstructured interview questions

- Can you tell me about a time when you found an interface to be confusing or difficult to use?
- What are some of the features that you find most important in a user interface?
- What are some of the things that you find most frustrating about user interfaces?
- What are some of the things that you think make a user interface enjoyable to use?
- What are some of the things that you think make a user interface accessible to people with disabilities?

Structured Interviews

- Structured interviews are a type of interview in which the interviewer asks a predetermined set of questions in a specific order. The questions are typically closed-ended, meaning that they have a limited number of possible answers.
- Structured interviews are often used in quantitative research, where the goal is to collect data that can be used to generalize to a larger population.

Examples of structured interview questions

- “Which of the following apps do you use most frequently: Prime Video, GoogleTV, or Netflix?”
- “How often do you watch streamed content: every day, once a week, once a month, less often than once a month?”
- “Do you ever purchase anything online: Yes/No? If your answer is Yes, approximately how often do you purchase things online: every day, once a week, once a month, less frequently than once a month?”

- Examples of structured interview questions that could be used in interface design:
- On a scale of 1 to 5, how easy was it to find the information you were looking for?
- How often do you use the search function?
- How satisfied are you with the overall design of the interface?

Semi-Structured Interviews

- Semi-structured interviews combine features of structured and unstructured interviews and use both closed and open questions.
- The interviewer has a basic script for guidance so that the same topics are covered with each interviewee.
- The interviewer starts with preplanned questions and then probes the interviewee to say more until no new relevant information is forthcoming.

Examples of semi-structured interview questions

- Interviewer: Which music websites do you visit most frequently?
- Interviewee: Mentions several but stresses that they prefer hottestmusic.com.
- Interviewer: Why?
- Interviewee: Says that they like the site layout.
- Interviewer: Tell me more about the site layout.
- Interviewee: Silence, followed by an answer describing the site's layout.

Focus Groups

- Focus groups are a type of qualitative research method that involves bringing together a small group of people to discuss a particular topic or issue.
- The discussion is typically guided by a moderator who asks open-ended questions and encourages participants to share their thoughts, feelings, and experiences.
- Normally, three to ten people are involved, and the discussion is led by a trained facilitator. Participants are selected to provide a representative sample of the target population.

- The benefit of a focus group is that it allows diverse viewpoints to be raised that might otherwise be missed, for example, in the requirements activity to understand multiple points within a collaborative process or to hear different user stories.
- The technique is appropriate for investigating shared issues rather than individual ones, and participants are encouraged to put forward their own perspectives.

Planning and Conducting an Interview

- Planning an interview involves developing the set of questions or topics to be covered, gathering any documentation to give to the interviewee, checking that recording software and equipment works, structuring the interview, and organizing a suitable time and location.
- The following are some of the activities in planning and conducting an interview;

Developing Interview Questions

- According to (Robson and McCartan, 2016), the following guidelines help in developing interview questions.
- Long or compound questions can be difficult to remember or confusing, so split them into separate questions.
- For example, instead of “How do you like this smartphone app compared with previous ones that you have used?” say, “How do you like this smartphone app?” “Have you used other smartphone apps?” If so, “How did you like them?”

- Interviewees may not understand jargon or complex language and might be too embarrassed to admit it, so explain things to them in straightforward ways.
- Try to keep questions neutral, both when preparing the interview script and in conversation during the interview itself.
- For example, if you ask, “Why do you like this style of interaction?” this question assumes that the person does like it and will discourage some interviewees from stating their real feelings.

Running the Interview

- Before starting the interview, it is important to check that the interviewee has received and read any project information sheet and has completed the informed consent form.
- Interviewees must be given the chance to ask any questions they have regarding any aspect of the process.
- This can often be done through email exchange before the day of the interview but can also be confirmed at the start of the interview.

Common sequences for an interview

- An introduction in which the interviewer introduces themselves and explains why they are doing the interview.
- Documentation for the interview is checked, and the interviewee is given a chance to ask questions and agree to being recorded.
- A warm-up session where straightforward questions come first. These may include questions about demographic information, such as “What area of the country do you live in?”

- A main session in which the questions are presented in a logical sequence, with the more probing ones at the end.
- A cooling-off period consisting of a few straightforward questions such as “Is there anything else you’d like to tell us?”
- A closing session in which the interviewer thanks the interviewee and stops any recording, signaling that the interview has ended.

Enriching the Interview Experience

- Enriching the interview experience is important for both the interviewer and the interviewee.
- A positive interview experience can lead to better communication, more accurate data, and a more fruitful exchange.
- Here are some strategies to enhance the interview experience.

- Create a welcoming and comfortable atmosphere. This can be done by providing refreshments, making eye contact, and using a friendly tone of voice.
- Be prepared and knowledgeable about the position. This shows that you are interested in the candidate and that you have taken the time to learn about the role.
- Ask open-ended questions that allow the candidate to elaborate on their skills and experience.
- Be an active listener. This means paying attention to what the candidate is saying and asking clarifying questions.

- Give the candidate the opportunity to ask questions. This shows that you are interested in their perspective and that you are willing to provide them with information about the position.
- Provide feedback. This could be done by summarizing the candidate's key strengths and areas for development.
- Follow up after the interview. This could be done by sending a thank-you note or by providing the candidate with additional information about the position.

Questionnaires

- Questionnaires are a valuable tool for gathering data from a large number of people in a relatively short amount of time.
- They can be used to collect both quantitative and qualitative data, and they can be administered in a variety of ways, including online, over the phone, or in person.
- Once a questionnaire is produced, it can be distributed to many participants without significant resources resulting to a larger set of data be collected than would normally be possible in an interview study.

Types of questionnaires

- Closed-ended questionnaires provide respondents with a fixed set of answer choices. This type of questionnaire is easy to analyze, but it can limit the range of responses that are obtained.
- Open-ended questionnaires allow respondents to answer questions in their own words. This type of questionnaire can provide more in-depth information, but it can be more time-consuming to analyze.

Questionnaire Structure

- Many questionnaires start by asking for demographic information such as gender, ethnicity, age, and details of relevant experience.
- Background information about a participant is useful for putting the questionnaire responses into context, provided it is relevant to the study goal.
- Specific questions relating to the study's goal usually come next. These questions may be subdivided into related topics to make it easier and more logical to complete.

General advice for designing a questionnaire

- Think about the ordering of questions. The impact of a question can be influenced by question order.
- Consider whether different versions of the questionnaire are needed for different populations.
- Provide clear instructions on how to complete the questionnaire, for example, whether answers can be saved and completed later. Aim for both careful wording and good typography.

- Think about the length of the questionnaire, and avoid questions that don’t address the study goals.
- Think about questionnaire layout and pacing; for instance, strike a balance between using white space, or individual web pages, and the need to keep the questionnaire as compact as possible.

Question and Response Format

- Questionnaires are often constructed with closed-ended questions giving a range of answers, including a “no opinion” or “none of these” option.
- Selecting the most appropriate question and response format makes it easier for respondents to answer clearly and for analysis to be focused.
- It’s also important to use negatively phrased questions carefully and avoid double negatives as they can be confusing and may lead to false information.
- The following question and response format can be used;

Ranges and Predefined Lists of Responses

- Responses to some questions fall within a predictable range or list.
- Nationality, for example, has a finite number of alternatives, and asking respondents to choose from a predefined list makes sense for collecting this information.
- A similar approach can be adopted if participants' ages are needed, although respondents are often asked to specify their age as a range rather than a specific number.

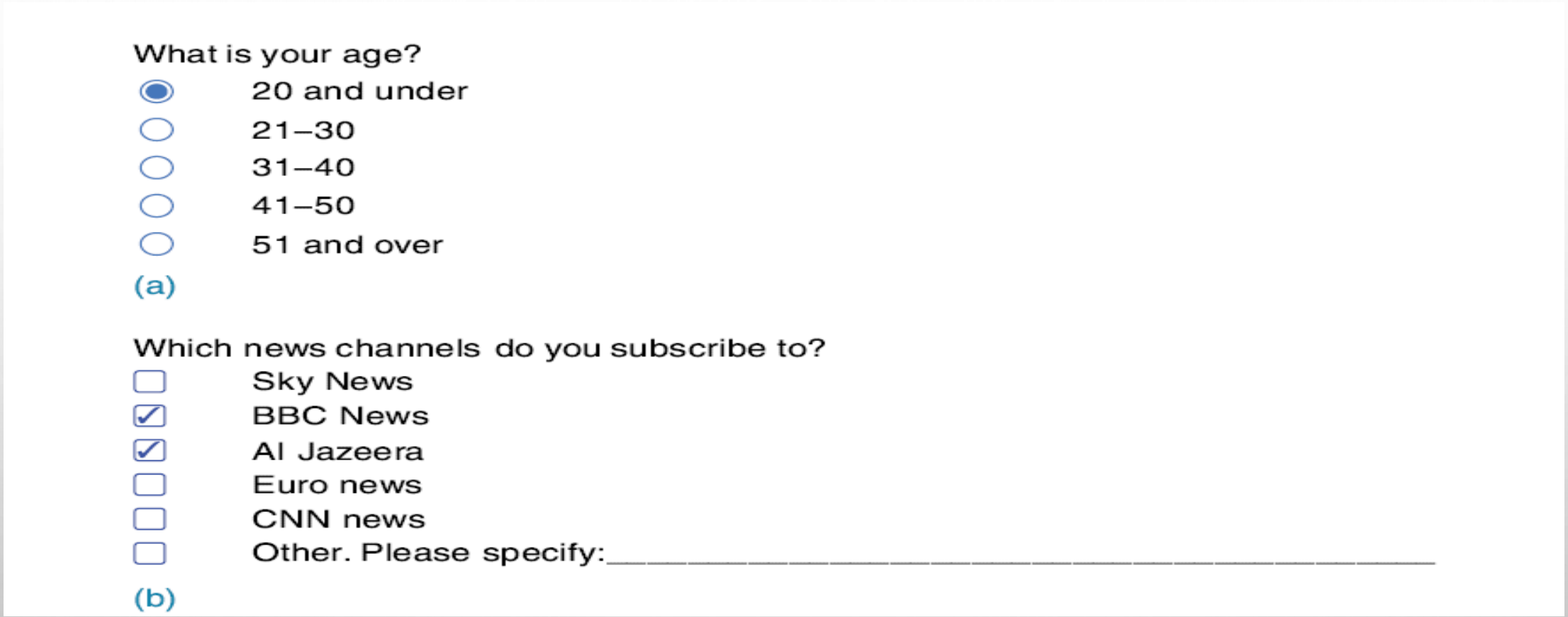


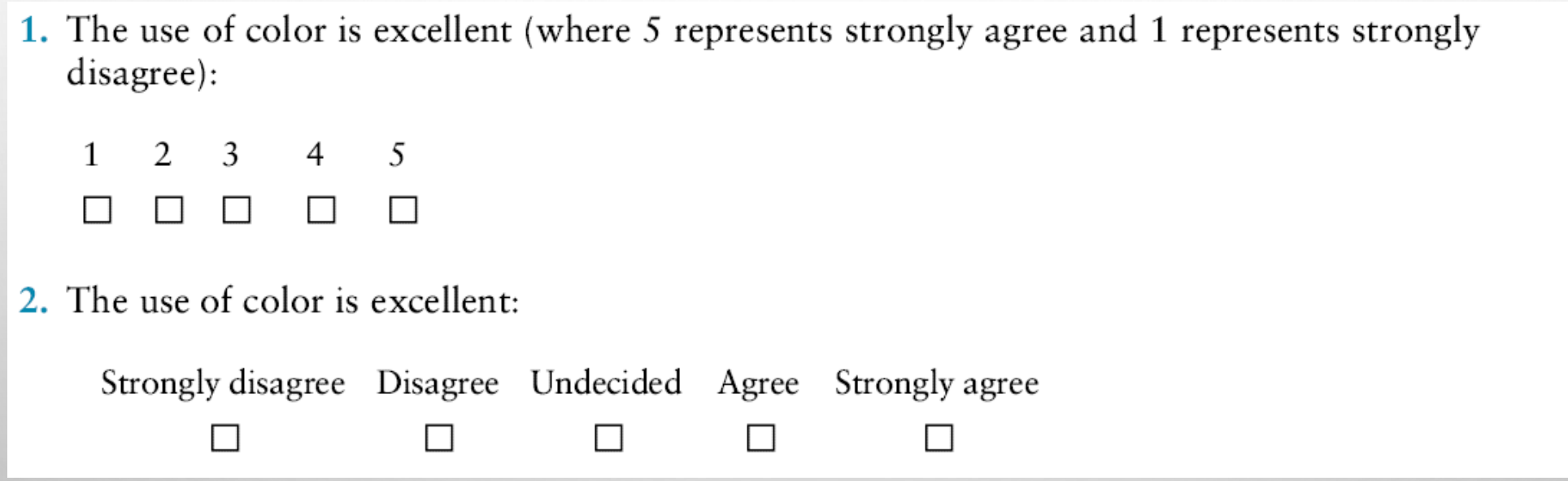
Figure 1: predefined list of responses (Yvonne Rogers, 2023, P.296)

Rating Scales

- There are a number of different types of rating scales, each with its own purpose.
- Two commonly used scales are the Likert and semantic differential scales.
- Their purpose is to elicit a range of responses to a question that can be compared across respondents.
- They are good for getting people to make judgments, such as how likely they are to recommend a product.

Likert Scales

❖Likert scales are used for measuring opinions, attitudes, and beliefs, and consequently they are widely used for evaluating user satisfaction with products.



1. The use of color is excellent (where 5 represents strongly agree and 1 represents strongly disagree):

1 2 3 4 5

☐ ☐ ☐ ☐ ☐

2. The use of color is excellent:

Strongly disagree Disagree Undecided Agree Strongly agree

☐ ☐ ☐ ☐ ☐

Figure 2: Likert scales (Yvonne Rogers, 2023, P.297)

Steps in designing a Likert scale questionnaire

- Gather a pool of short statements about the subject to be investigated.
- Decide on the scale. There are three main issues to be addressed here: How many points does the scale need? Should the scale be discrete or continuous? How can the scale be represented?
- Select items for the final questionnaire, and reword as necessary to make them clear.

Administering Questionnaires

- Administering questionnaires is a common method of data collection in research, surveys, and assessments.
- The process involves distributing questionnaires to participants, either in paper form or electronically, to gather information on various topics.

Factors to consider when administering questionnaires

- **Method of administration**: Questionnaires can be administered in a variety of ways, including online, over the phone, in person, or by mail. The best method of administration will depend on the target audience and the purpose of the questionnaire.
- **Sampling**: It is important to ensure that the sample of respondents is representative of the target population.
- **Incentives**: Offering incentives can increase the response rate. Incentives can be monetary or non-monetary.
- **Confidentiality**: It is important to assure respondents that their responses will be kept confidential. This can be done by including a confidentiality statement in the questionnaire.

- **Pilot testing**: It is important to pilot test the questionnaire before using it. This will help to identify any problems with the questionnaire and to ensure that it is clear and easy to understand.
- **Data collection**: Once the questionnaire has been administered, the data needs to be collected.
- **Data analysis**: Once the data has been collected, it needs to be analyzed. This can be done using a variety of statistical methods.
- **Reporting**: The results of the questionnaire need to be reported in a clear and concise manner.

- Deploying an online questionnaire involves the following steps.
- **Plan the survey timeline**. If there is a deadline, work backward from the deadline and plan what needs to be done on a weekly basis.
- **Design the questionnaire offline**. Using plain text is useful as this can then be copied more easily into the online survey tool.
- **Program the online survey**. How long this will take depends on the complexity of the design, for example, how many navigational paths it contains or if it has many interactive features.

- Test the survey, both to make sure that it behaves as envisioned and to check the questions themselves. This includes getting feedback from content experts, survey experts, and potential respondents.
- Recruit respondents. Participants may have different reasons for taking part in the survey, but especially when respondents need to be encouraged, make the invitations exciting, simple, friendly, respectful, trustworthy, motivating, interesting, informative, and short.

Observation

- Observation is a data gathering method that involves systematically watching and recording behaviors, events, or phenomena as they naturally occur in their real-life context.
- Observation is useful at any stage during product development. Early in design, observation helps designers understand people's context, tasks, and goals.
- Observation conducted later in development, for example, in evaluation, may be used to investigate how well a prototype supports these tasks and goals.

Direct Observation in the wild

- Direct observation in the wild can be a valuable method for gathering data on how users interact with interfaces in their natural settings.
- This can be done by observing users as they use interfaces in their homes, offices, or other public places.
- By observing users in their natural settings, researchers can gain a deeper understanding of how users interact with interfaces in the real world.
- Some of the most common techniques include:

- **Contextual inquiry**: In contextual inquiry, the observer visits the user's workplace or home and observes them as they use interfaces in their everyday work or life.
- **Think-aloud protocols**: In think-aloud protocols, the user is asked to verbalize their thoughts as they use an interface. This can help researchers to understand the user's mental model of the interface and their decision-making processes.
- **Eye tracking**: Eye tracking can be used to record where users look on a screen as they use an interface.

Direct observation in controlled environment

- It occurs within a purpose-built usability lab, or portable lab.
- It is more formal than observation in the wild where a script is prepared to guide how the participant will be greeted, told about the goals of the study and how long it will last

Indirect observation: tracking user activities

- Sometimes direct observation is not possible because it is too intrusive, or observers cannot be present because of access restrictions or remote participation and so activities are tracked indirectly using diaries and interaction logs

Putting the Techniques to Work

- The techniques introduced here may be used on their own, but it is more likely that they will be combined for any one project and may be adapted.
- Combining data gathering techniques into a single data gathering program is common practice, for example, when collecting case study data.
- The benefit of doing so is to provide multiple perspectives, e.g., to achieve triangulation, but also to provide data about different aspects of the activity or context under study.

Factors Choosing Techniques

- The research question: The research question will determine the type of data that is needed.
- The target population: The target population is the group of people or things that the research is about. The data collection technique must be able to reach the target population.
- The resources available: The resources available will determine the feasibility of using different data collection techniques.
- The time constraints: The time constraints will determine the feasibility of using different data collection techniques.

Adapting Techniques for Different Participants

- Adapting data collection techniques for different participants is important to ensure that the data collected is valid and representative of the target population.
- Some of the ways in which data collection techniques can be adapted for different participants include:

- **Language**: Data collection materials should be translated into the languages spoken by the target population. If this is not possible, bilingual interviewers or interpreters can be used.
- **Literacy**: Data collection materials should be designed to be accessible to people with low literacy levels. This may involve using simple language, avoiding jargon, and providing clear instructions.
- **Culture**: Data collection materials should be culturally sensitive. This may involve avoiding questions that are considered taboo or offensive in certain cultures.

- **Disability**: Data collection materials should be accessible to people with disabilities. This may involve providing materials in alternative formats, such as Braille or large print.
- **Age**: Data collection materials should be appropriate for the age of the target population. For example, questions that are appropriate for adults may not be appropriate for children.
- **Gender**: Data collection materials should be gender-neutral. This may involve avoiding questions that are based on gender stereotypes.

References

- Preece, R., Rogers, Y., & Sharp, H. (2023). Interaction Design: Beyond Human-Computer Interaction. J. Wiley & Sons.

- Robson, c. and mccartan, K. (2016) real world research (4th ed.). John wiley & sons.

Thank you

Next Lecture We Shall Look At

Discovering Requirements: what are requirements, data gathering for requirements, personas and scenarios