

Lesson 5

Interaction Design (CM3055)

Learning Objective:

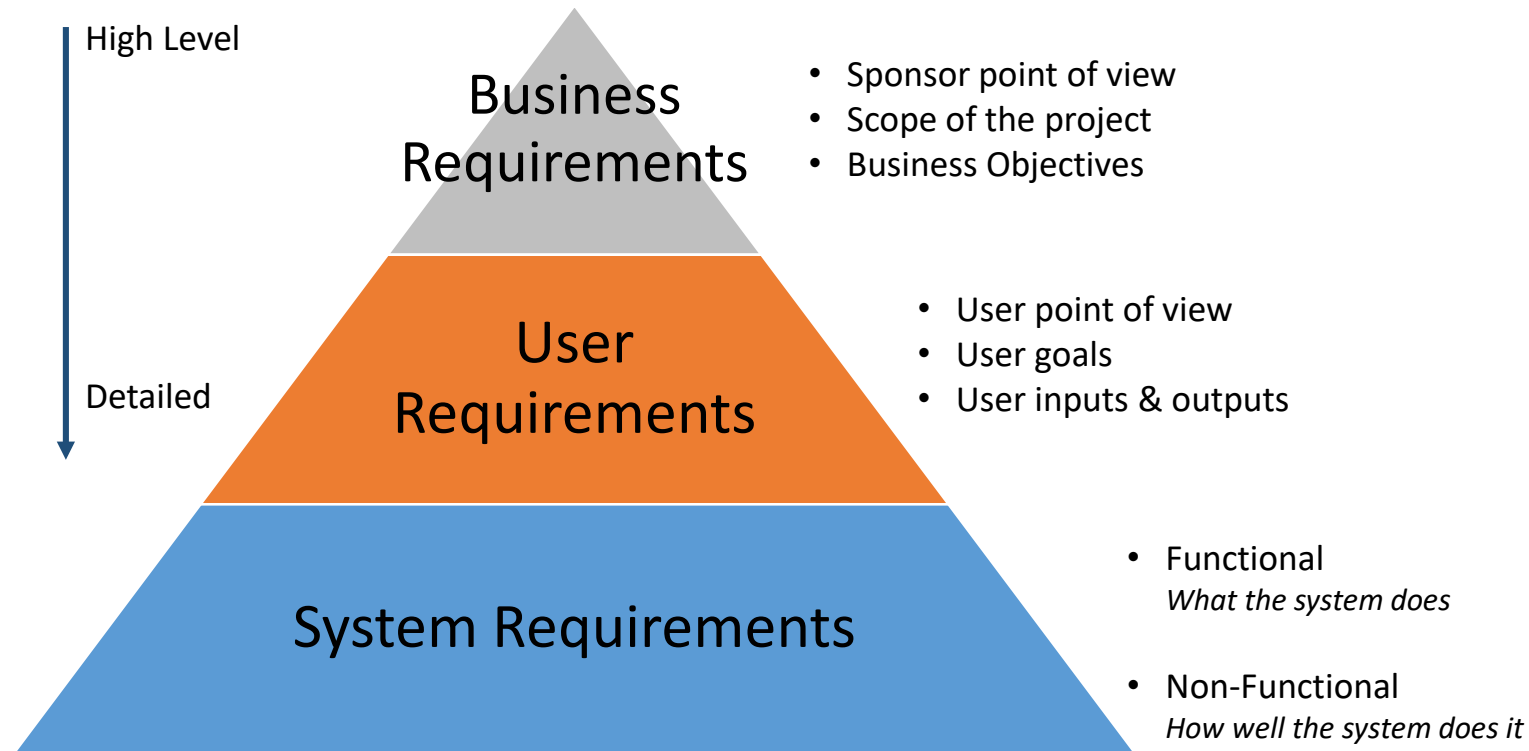
1. Choose the appropriate method for data collection
2. Formulate questions to guide user research
3. Design appropriate plans to run specific user research

Interviews & Focus Groups

Questionnaires

Requirements Gathering

A **requirement** is a statement about an intended product that specifies what it should do or how to do it



Diagrammatic representation of the different types of requirements

Source: Sathees Practice

Category of Requirements

Category
• Functional Requirements
• Data Requirements
• Environmental Requirements
• User Requirements
• Usability Requirements



Description
• What the product should do
• The type, volatility, size/amount, persistence, accuracy, value of the amounts of the required data
• Or “context of use” – circumstance in which the interactive product must operate
• Characteristics of the intended user group
• The usability goals and associated measures

2 types of **System Requirements**

1. **Functional Requirements**

specify the software functionality that must be built into the product to enable users to accomplish their tasks, thereby satisfying the business requirements.

functional requirements state what the system must do

ie. “the website **shall** notify the administrator via email when a user registers with it”

- Business rules
- Transaction corrections, adjustments
- Administrative functions
- Authentication
- Audit tracking
- External interfaces
- Certification requirements
- Reporting requirements
- Historical data
- Legal / Regulatory requirements

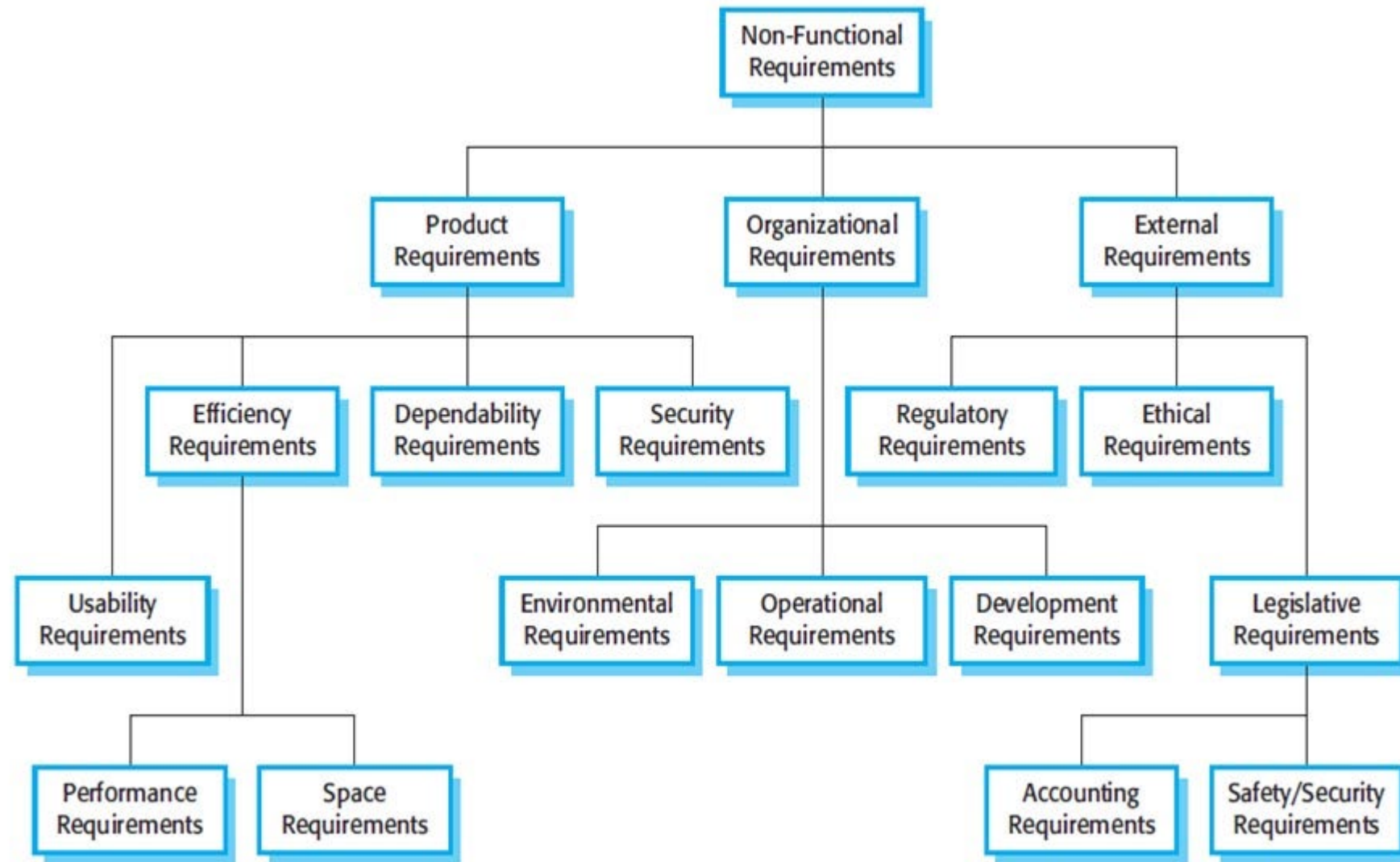
2 types of **System Requirements**

2. **Non-Functional Requirements**

Constraints or standards that the system must have or comply with.

Non-functional requirements define the system's quality characteristics.

- Scalability
- Capacity
- Availability
- Reliability
- Recoverability
- Maintainability
- Serviceability
- Security
- Regulatory
- Manageability
- Environmental
- Data Integrity
- Usability
- Interoperability
- Performance



This diagrammatic representation of non-functional requirements shows how they are related

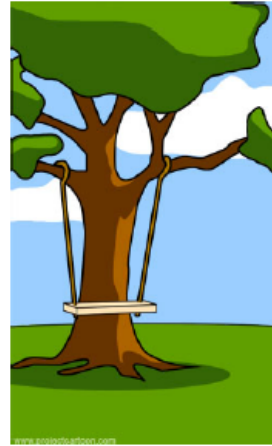
Source: Robinsce

gather data related to **user needs** > **analyse** it > elicit the **user requirements**

How Projects Really Work



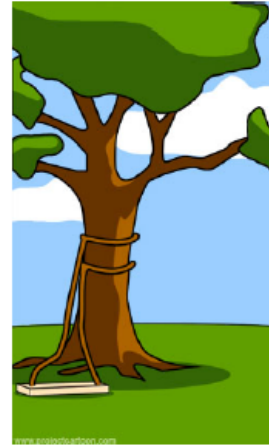
How the customer explained it



How the project leader understood it



How the analyst designed it



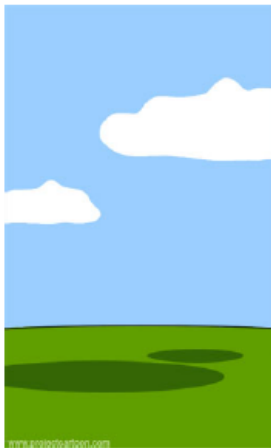
How the programmer wrote it



What the beta testers received



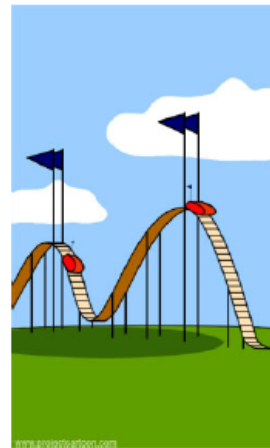
How the business consultant described it



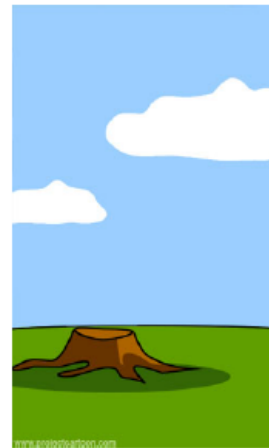
How the project was documented



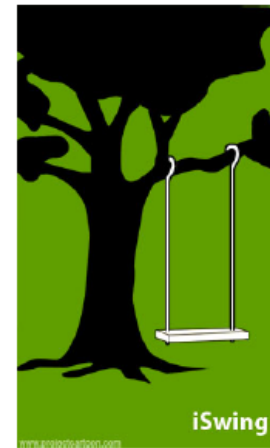
What operations installed



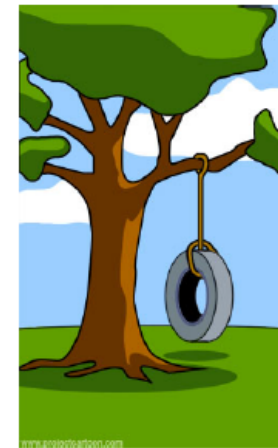
How the customer was billed



How it was supported



What marketing advertised



What the customer really needed

The famous cartoon entitled "Project Cartoon" captures the sad reality behind bad requirements gathering

Data Types

2

Process

- observations of what users are doing

Operational

- Specifics (i.e. summaries of what happened in terms of time spent, number of errors made, or the type of independent and dependent variables used in experimentation)
- Hard to obtain in a reliable manner (ie. many users are required for statistical significance) and will not always inform design (summaries may just identify that a system is too slow or that there are too many errors)

To better understand when to use which method, it is helpful to view them along a **3-dimensional framework** with the following axes:

1. Attitudinal vs. Behavioral
2. Qualitative vs. Quantitative
3. Context of Use

Attitudinal vs. Behavioral Dimension



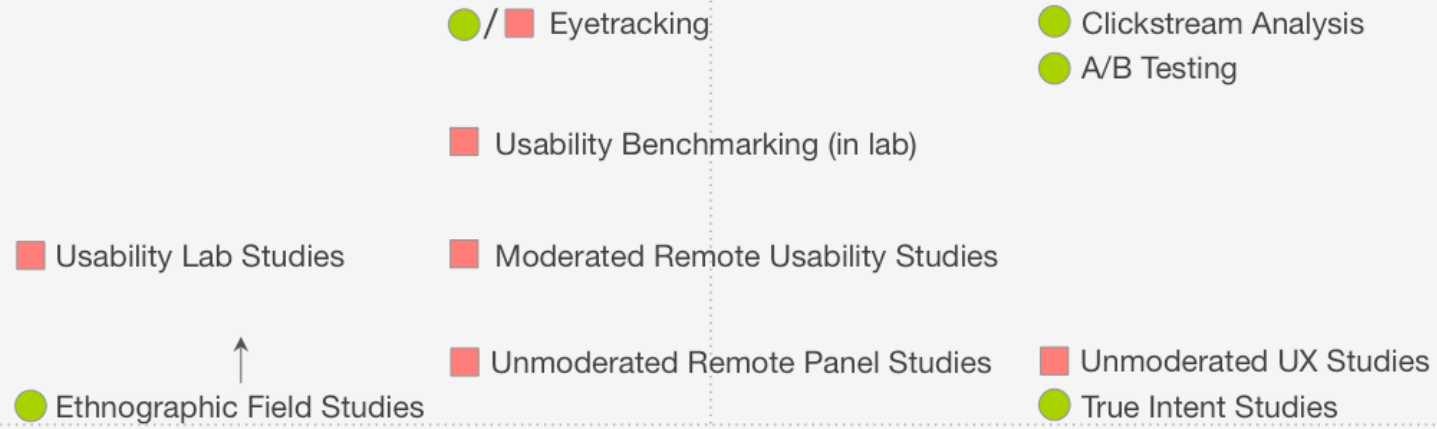
what people say



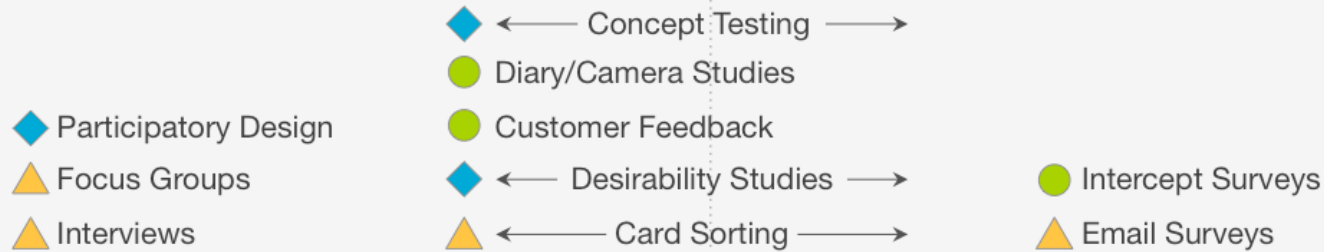
what people do

A LANDSCAPE OF USER RESEARCH METHODS

BEHAVIORAL



ATTITUDINAL



QUALITATIVE (DIRECT)

QUANTITATIVE (INDIRECT)

KEY FOR CONTEXT OF PRODUCT USE DURING DATA COLLECTION

- Natural use of product
- Scripted (often lab-based) use of product
- ▲ De-contextualized / not using product
- ◆ Combination / hybrid

Qualitative (qual) vs Quantative (quan) Dimension

Extra Reading:

<https://www.uxmatters.com/mt/archives/2012/09/strengths-and-weaknesses-of-quantitative-and-qualitative-research.php>

video

QUESTIONS ANSWERED BY RESEARCH METHODS ACROSS THE LANDSCAPE

BEHAVIORAL

WHAT PEOPLE DO

WHY &
HOW TO FIX

HOW MANY &
HOW MUCH

WHAT PEOPLE SAY

ATTITUDINAL

QUALITATIVE (DIRECT)

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QUANTITATIVE (INDIRECT)

Qualitative (qual) data

- Relies on verbal narrative like spoken or written data
- If you want to understand how a person's height affects them, or what they think about their weight
- An effort to understand situations in their uniqueness as part of a particular context and the interactions there (Patton, 1985)
- Sometimes called categorical data (data that can be arranged into categories based on physical traits, gender, colors or anything that does have a number associated with it)
ie. Gender (Male, Female), Qualification (A Levels, Diploma, Degree...)

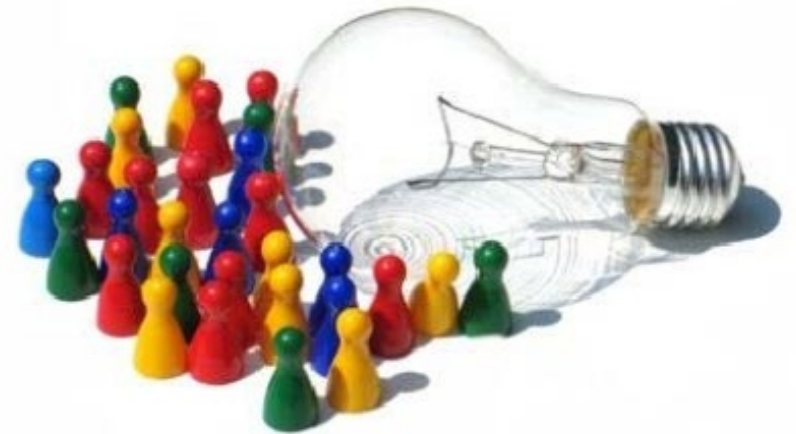


Key characteristics of Qualitative data

- Descriptive
- Researcher is the primary instrument for data collection and analysis
- Researcher must go to the people, setting, site, institution, in order to observe behavior in its natural setting – fieldwork involved
- Uses inductive research strategy (builds abstractions, concepts, hypothesis, or theories rather than tests existing theory)
- Qualitative findings are in the form of themes, categories, concepts or tentative hypotheses or theories

Example:

Giving a speaker feedback on how he managed the workshop. Ie, too fast



Graphic by David Engelby

Qualitative



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graph LR; Qualitative --> Nominal; Qualitative --> Ordinal;
```

Nominal

have categories with no distinct or defined order.
i.e. gender, favourite color, nationality

Ordinal variables have an inherent order.

i.e. Likert scales (strongly disagree, disagree, neutral, agree, strongly agree), T-shirt size (small, medium, large)

Quantitative (quan) data

- Data that can be expressed as a number or can be quantified
- Measured by numerical variables
- Can be represented with a wide variety of statistical types of graphs and charts such as line, graph, bar graph, scatter plot etc

Key characteristics of Quantitative data

- Can be quantified and verified
- Can be counted (data type) number and statistics
- Answers questions such as “how many, “how much” and “how often”

Examples:

Scores on tests, weight of a person, shoe size, salary



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Quantitative



```
graph LR; A[Quantitative] --> B[Discrete data]; A --> C[Continuous data];
```

Discrete data

- a count that involves integers
- limited number of values
- cannot be subdivided into parts
i.e, number of children. You can't count 5.5 kids

Continuous data

- can be meaningfully divided into finer levels
- can be measured on a scale and can have almost any numeric value
i.e. height at very precise scales — meters, centimeters, millimeters

Basis for Comparison	Qualitative Research	Quantitative Research
Meaning	A method of inquiry that develops understanding on human and social sciences, to find the way people think and feel.	
Nature	Holistic	
Approach	Subjective	
Research type	Exploratory	
Reasoning	Inductive	
Sampling	Purposive	
Data	Verbal	
Inquiry	Process-oriented	
Hypothesis	Generated	
Elements of analysis	Words, pictures and objects	
Objective	To explore and discover ideas used in the ongoing processes.	
Methods	Non-structured techniques like In-depth interviews, group discussions etc.	
Result	Develops initial understanding	

Basis for Comparison	Qualitative Research	Quantitative Research
Meaning	A method of inquiry that develops understanding on human and social sciences, to find the way people think and feel.	A research method that is used to generate numerical data and hard facts, by employing statistical, logical and mathematical technique.
Nature	Holistic	Particularistic
Approach	Subjective	Objective
Research type	Exploratory	Conclusive
Reasoning	Inductive	Deductive
Sampling	Purposive	Random
Data	Verbal	Measurable
Inquiry	Process-oriented	Result-oriented
Hypothesis	Generated	Tested
Elements of analysis	Words, pictures and objects	Numerical data
Objective	To explore and discover ideas used in the ongoing processes.	To examine cause and effect relationship between variables.
Methods	Non-structured techniques like In-depth interviews, group discussions etc.	Structured techniques such as surveys, questionnaires and observations.
Result	Develops initial understanding	Recommends final course of action

Quantitative

- 12 ounces of latte
- Serving temperature 150° F
- Serving cup 7 inches in height
- Cost: \$5.95

Qualitative

- Robust aroma
- Frothy appearance
- Strong
- Tall latte glass



Context of Product Use

- **Natural** or near-natural use of the product
- **Scripted** use of the product
- **Not using** the product during the study
- A **hybrid** of the above

Leverage User Research

Methods *throughout* Development

By Nielsen Norman Group

1. Discover - Determine what's relevant for users.

- **Diary studies** – Have users log their performance of activities or record their daily interactions with a design.
- **Contextual inquiries** – Interview suitable users in *their own environment* to find out how they perform the task/s in question.

2. Explore - See how to address all users' needs.

- **Card sorting** – On cards, write words and phrases and then let participants organize these in the most meaningful way and label categories to ensure your design is logically structured.
- **Customer journey maps** – Create user journeys to reveal potential pitfalls and crucial moments.

Leverage User Research Methods *throughout* Development

By Nielsen Norman Group

3. Test - Evaluate your designs.

- **Usability testing** – Make sure your design is easy to use.
- **Accessibility evaluations** – Test your design to ensure everyone can use it.

4. Listen - Put issues in perspective, uncover any new problems and spot trends.

- **Analytics** – Gather analytics/metrics to chart (e.g.) website traffic and generate reports.
- **Surveys/Questionnaires** – Track how users' feel about your product/design via these.

Format of an interview:

1. Introduction

- details what you will say to the participant before the session begins, and serves as a nice preview of all the different points you'll be discussing.

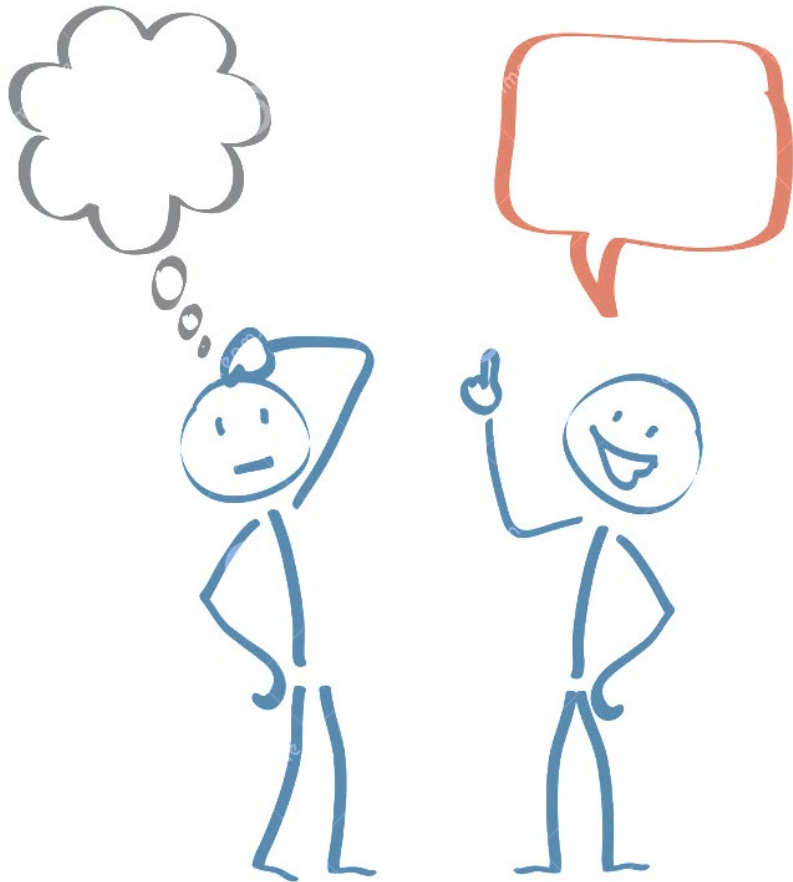
2. Questions

- Write down some of the open-ended questions we want to ask users during the session.

3. Wrap-up

- is a reminder of all the items to mention during the end of an interview.
- Can cover information such as compensation, asking if they would be interested in future research, and assuring them that you are thankful for their time.

Asking users: Through interviews



- **1) Structured** - prepared a number of relevant questions to guide the interview but be prepared to deviate, **2) Unstructured**, **3) Semi-structured (mixed)**
- Useful technique for providing an initial overview of the task or set of tasks in the domain. Suitable for extracting rules, general principles behind task execution and background information, covering low probability events and the reasons underlying behaviour.
- Less time to carry out than other techniques. Rarely provide specific enough in-depth knowledge descriptions.
- Useful for obtaining information early in requirements analysis. Can be used to guide later observation studies.
- Reliability of answers can be a problem. To be used in conjunction with direct or indirect observation of the task performance of a number of individuals.



Asking users

Questionnaires

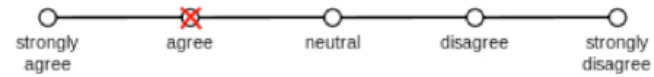
- Prepared in advance and easily created
- Fairly inflexible (specific and structured questions for a large sample will have been created)
- Suitable for extracting rules, general principles behind task execution and background information, covering low probability events and the reasons underlying behaviour
- Return rate of questionnaires is rarely better than 25%
- Should be short enough to allow completion in a reasonable amount of time and that pilot testing is very important
- Often used to measure subjective user preferences and as rating scales for many design attributes. i.e. Likert scale - neutral position and either a 5- or a 7-point scale.

Asking users: Through focus group

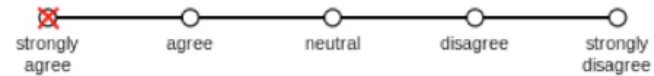


- Easier to manage
- Collection of users - representative of a user population, gathered together and asked to respond to structured questions.
- Facilitator will lead and manage the questioning and discussion
- Session is often recorded
- Valuable in ascertaining how widespread or common opinions are, in gauging initial responses and reactions, and for limited problem identification.
- Not a good form of data gathering for specific low-level detail

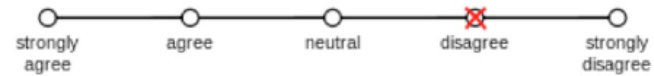
1. Wikipedia has a user friendly interface.



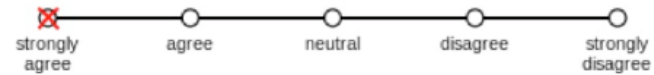
2. Wikipedia is usually my first resource for research.



3. Wikipedia pages generally have good images.



4. Wikipedia allows users to upload pictures easily.



5. Wikipedia has a pleasing color scheme.



Asking users: Through experimental techniques

- Rating scales (Likert scale)

#	Question	Survey Scale: 1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree				
		1	2	3	4	5
1	I have easy access to the supplies and equipment I need to do my work on this unit.					
2	The support services to this unit respond in a timely way.					
3	I can discuss challenging issues with care team members on this unit.					
4	My ideas really seem to count on this unit.					
5	I speak up if I have a patient safety concern.					
6	Care team members on this unit feel free to question the decisions or actions of those with more authority.					
7	Important patient care information is exchanged during shift					

	color
1	Green
2	Red
3	Yellow
4	Red
5	Red
6	Green
7	Yellow
8	Green
9	Green
10	Red
11	Green
12	Yellow
13	Red
14	Green

Basic Colors				
	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Green	6	42.9	6	42.9
Red	5	35.7	11	78.6
Yellow	3	21.4	14	100.0
Total	14	100.0		

- **frequency counts**

- number of times the target behaviour occurred during the observation period?

ie, number of times a student raises his hand in a 15 mins class, number of people who answer yes/no in a question

How to Create Effective User Surveys

- **Writing the questions**

Types of Questions

- Closed vs Open
- Quantitative vs Qualitative

Question Completeness

Keep it simple - avoid double barreled questions

How to Create Effective User Surveys

Bias and Priming

- write your questions in a way that does not bias/ or have priming effect on your respondents

i.e. What impact does our product have on your life?”

With the following response options:

1. Extremely positive
2. Very positive
3. Somewhat positive
4. Not positive



The scale is balanced
towards positive

3 positive options and
only 1 negative option

How to Create Effective User Surveys

- **How to get people to participate**

Length of survey

- a key factor in response rate

Structure of survey

structure your survey in a way that minimizes the number of people dropping out

Funnel - ask basic, general questions at the beginning, more complex questions in the middle, and then return to general questions at the end.

Incentives - Is there a benefit? Are there drawbacks to incentivize.

Questions to ask users during Prototype Testing

What kind of questions would you ask?

First Glance Testing

Validate if the design communicates what the product/website is at first glance.

Task-specific by Use Case

Develop task-specific questions for the types of actions you know users will take on your site given your industry.

Assess usability

Ask these questions after users complete tasks to gain a better understanding of usability.

Holistic experience

Finalize testing with questions that collect the information you haven't captured yet.

TEDW approach

“Tell me...”

“Explain....”

“Describe....”

“Walk me through....”

Framing questions
using the **Taxonomy of
Cognitive Domain**

Domain	Critical Thinking Process	Verb Question
Knowledge	Remembering Memorizing Recognising	Who What When Where How
Comprehension	Interpreting Translating Describing	Explain Outline Distinguish Compare Define
Analysis	Separating Finding structure	Contrast Categorize Identity Separate Diagram
Synthesis	Creating Combining	Create Imagine Design Propose Invent
Evaluation	Judging Resolving	Select Decide Prioritize Rate Discuss

Activity: Conduct a remote interview

Choose a task people do online (e.g. shopping, reading news) and conduct a remote interview with someone you know. Think about how you will take notes. Consider:

- the type of data you expect to collect
- the structure of the interview
- will you provide instructions in advance?
- how might you debrief the participant?

Make some notes on the data you collected. Think about the following:

- was this a valid way to capture this data?
- do I trust the results of the interview?
- what would I do differently to improve upon this process in future?