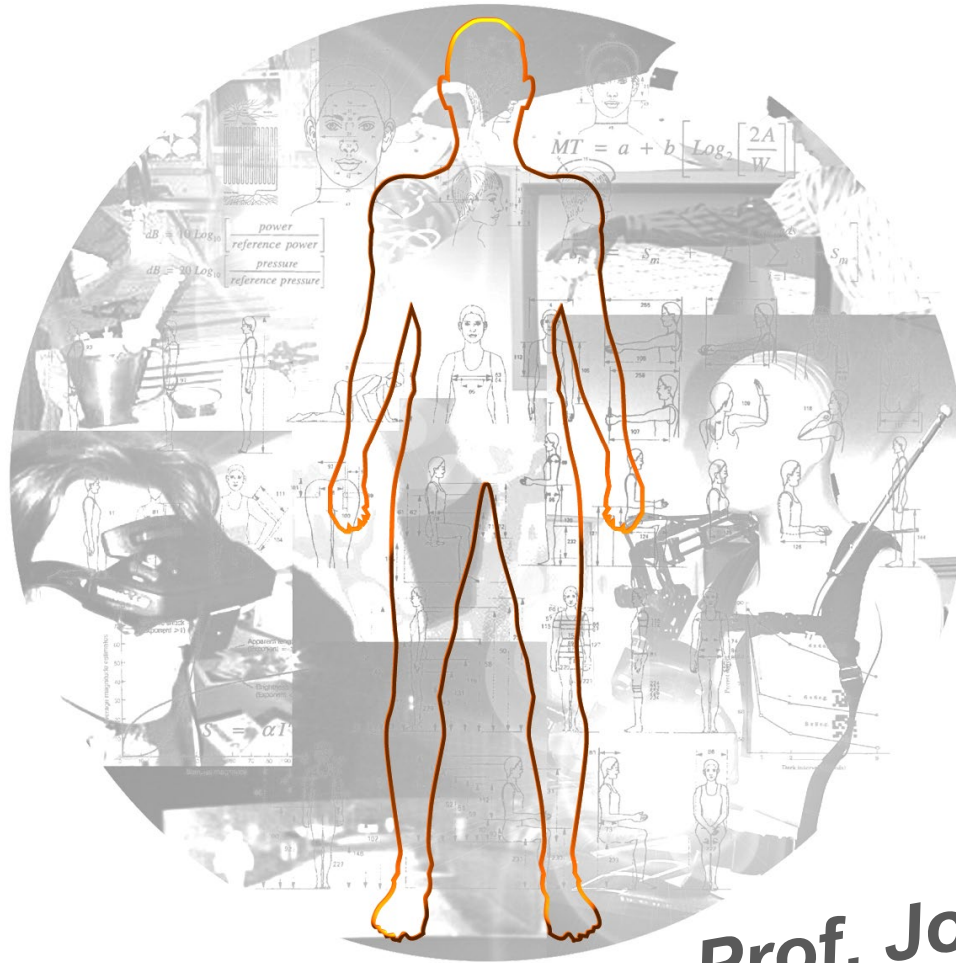# Human Centred Design Methods

Prof. Joseph Giacomin

Human Centred Design

Human Centred Design

Human centred design involves techniques which communicate, interact, empathise and stimulate the people involved, obtaining an understanding of their needs, desires and experiences which often transcends that which the people themselves actually knew and realised.
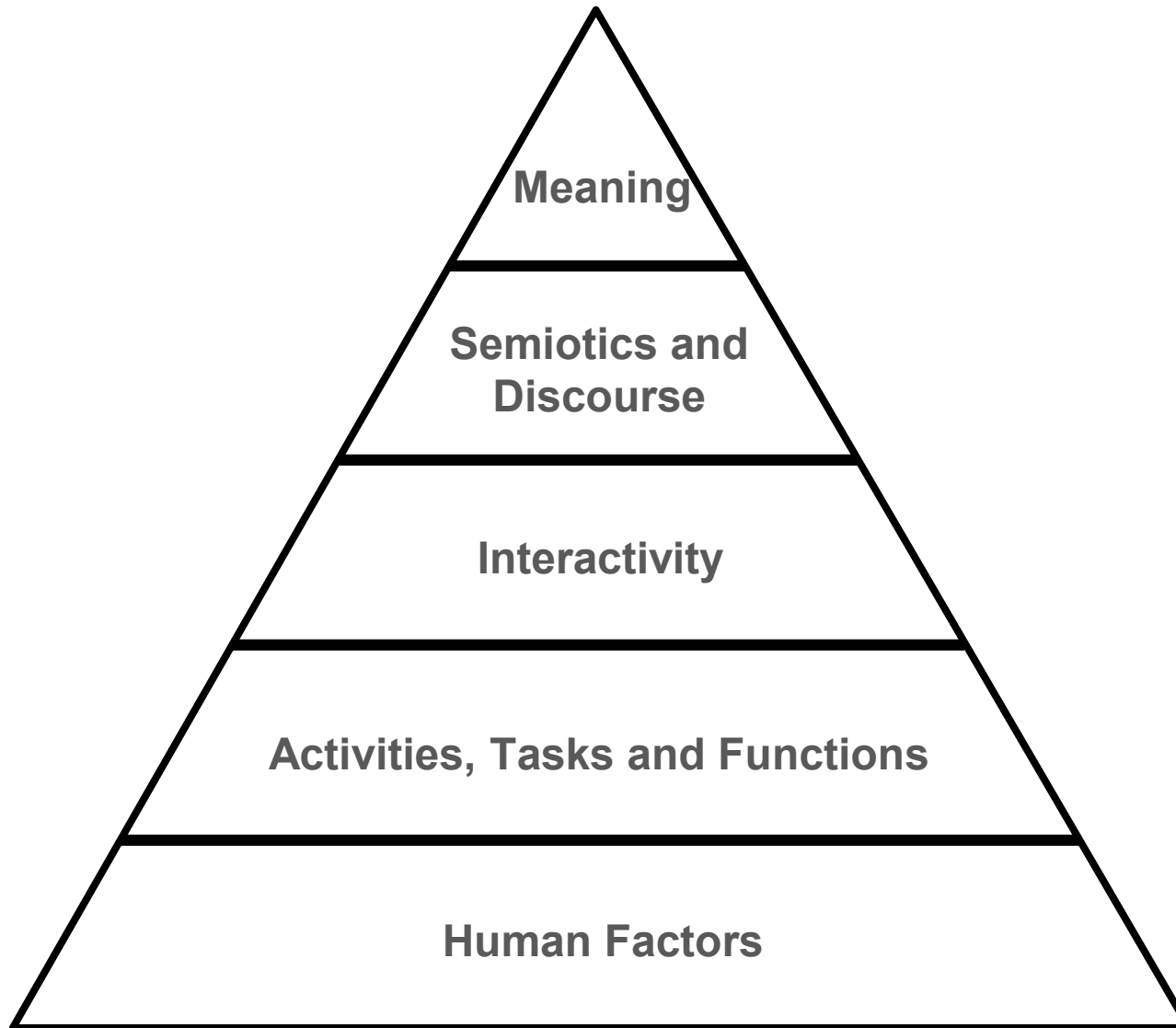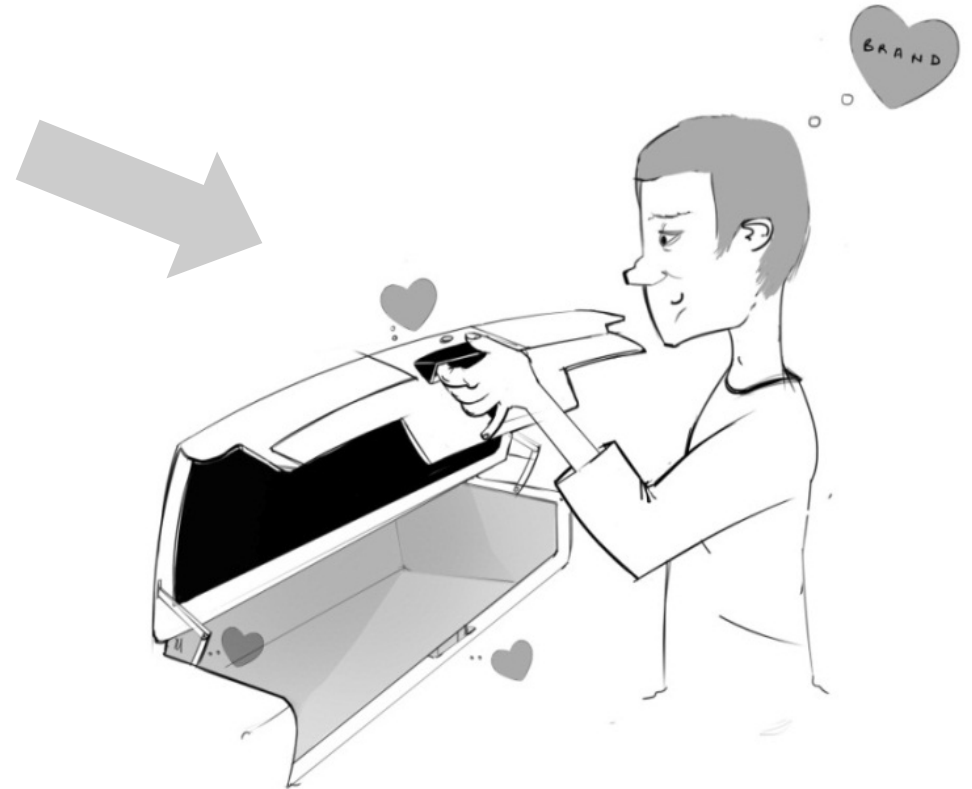
Human Centred Design

Human centred design is a form of structured empathy.

The Human Centred Design Pyramid

Meaning

Semiotics and Discourse

Interactivity

Activities, Tasks and Functions

Human Factors

Giacomin, J. (2014), What is human centred design?, The Design Journal, Vol. 17, No. 4, pp 606-623.

The general trend is a reduced emphasis on matters of "physics", which are now minimum requirements, and a greater emphasis on matters of "metaphysics".

Human Centred Design Process

customer testing

prototyping

technical specifications

metaphor co-design

meaning elicitation

time →

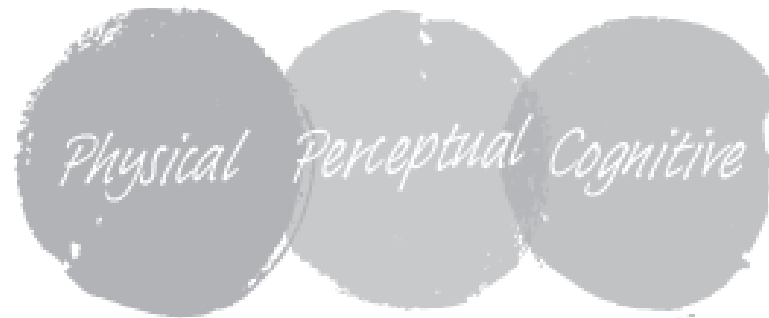# Examples Of HCD Methods

DE GRUYTER

Voula Gkatzidou, Joseph Giacomin, Lee Skrypchuk

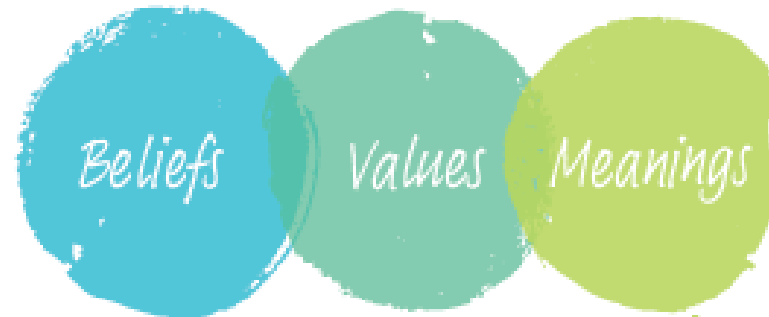# AUTOMOTIVE HUMAN CENTRED DESIGN METHODS

HCD Information

facts

Physical Perceptual Cognitive

visible

Interactions Behaviours Metrics

invisible

Beliefs Values Meanings

HCD Method Characteristics

	Method Characteristic	Definition
1	Time Taken	Estimated time of completion
2	Effort	Information time for preparation, processing and analysing results
3	Cost	Recruitment, participant reimbursement and staff times
4	Staff	Number of staff members required to apply each method
5	Input	Description of artefacts required for method execution
6	Participants	Participant information and size
7	Purpose	Purpose of the method
8	Output	Format and typology of the benefits of the methods to the design team.
9	Setting	Details on the required setting of the method
10	Related Methods	Methods that discover similar type of information or methods that can be triangulated with specific method
11	Resources	Additional resources about the method with focus on automotive design examples
12	Time perspective	Time frame of the information collected

HCD Methods

#	Method	visibility
1	AEIOU	👁 👁̸
2	Affinity Diagram	👁 👁̸
3	Bodystorming	👁 👁̸
4	Brainstorming	👁
5	Buy a Feature	👁 👁̸
6	Card Sorting	👁 👁̸
7	Co-Design	👁 👁̸
8	Cognitive Walkthrough	👁
9	Cognitive Map	👁
10	Competitive Analysis	👁
11	Contextual Inquiry	👁 👁̸
12	Crazy 8s	👁
13	Crowdsourcing	👁
14	Cultural Probes	👁̸
15	Customer Journey	👁
16	Delphi Survey	👁
17	Design Fiction	👁 👁̸
18	Desirability Testing	👁
19	Diary Study	👁 👁̸
20	Empathy Map	👁̸
21	Experience Prototyping	👁̸
22	Extreme Users	👁 👁̸
23	Fly-on-The-Wall	👁 👁̸
24	Focus Group	👁
25	Harris Profile	👁
26	Heuristic Evaluation	👁
27	How Might We?	👁
28	Interview	👁 👁̸
29	Laddering	👁̸
30	Love/Break Up Letter	👁̸
31	Persona	👁̸
32	Picture Cards	👁 👁̸
33	Repertory Grid Technique	👁̸
34	Role Playing	👁 👁̸
35	Scenario	👁
36	Scenario Mapping	👁
37	Stakeholder Analysis	👁
38	Storytelling	👁 👁̸
39	Storyboarding	👁 👁̸
40	Survey	👁
41	Think-Aloud	👁
42	Touchstone Tour	👁
43	Tomorrow's Headlines	👁 👁̸
44	Wizard of Oz	👁
45	World Concept Association	👁̸
46	Zaltman Metaphor Elicitation	👁̸
47	5 Whys	👁̸

visible 👁

invisible 👁̸

Interactions Behaviours Metrics

Beliefs Values Meanings

31. Persona

A method which summarises, models and communicates the research about the people that you are designing for.

Description

Personas are imaginary characters based on real people that represent user archetypes. Personas consolidate archetypal descriptions of customer behaviour patterns into representative profiles and answer the question: "Who are we designing for?"

Personas are synthesised from a series of ethnographic activities with real people, then captured in descriptions that include behaviour patterns, goals, skills, attitudes, and environment.

For the purposes of persona definition there are typically three dominant types of data which can be used: demographic, sociological and behavioural.

For example, in an automotive context, demographic information can include age and/or gender, sociological information can include occupation and behavioural information can include attitudes towards automobile usage.

Purpose

To apply empathetic focus to the design process by judging options against the background of a complete person, characterised by numerous and complex characteristics.

Input

N/A

Participants

Design Team.

Method Info

Time	●○○
Effort	●○○
Staff	●○○
Cost	●○○
Time perspective	**Present/Past**
Setting	**Independent**

Steps

1 Gather data: You can begin by compiling everything you know about your customers. Create an initial spectrum of customers by collecting information from all sources, including data from other departments (i.e. marketing) within the organisation. From here, you can form questions about your customers and work out what they have in common and also how they differ.

2 Ethnography: Meet the customer and apply ethnographic methods (contextual inquiry, ethnographic interview, observation) to gather data on what your customers actually do, as opposed to asking them to tell you what they do.

3 Synthesise with the team: Look at the data you collected and search for emerging themes or behavioural patterns. Are there certain frustrations that are common between your participants? Can you identify any design opportunities to help alleviate those frustrations?

4 Create: Create a template for the personas that includes information such as name, job title, demographics (e.g. age, education, family status, ethnicity), personal needs, desires and goals, expertise, physical, social, and/or technological environment, habits, motivations, feelings.

Beliefs Values Meanings

Outcome
A narrative that describes environment, feelings, attitudes and goals sufficiently to permit the imagining of a real and complex person, whose lifestyle and needs might be anticipated

Related Methods
Personas and Scenarios are interlinked and one cannot be without the other.

An Affinity Diagram can be used to gather and synthesise data for the persona

Cultural Probes can be used to gather data for the personas

Resources
Kim Goodwin: Perfecting your Personas:
https://www.cooper.com/journal/2008/05/perfecting_your_personas/

Tina Calabria: An Introduction to Personas and how to create them: https://www.steptwo.com.au/papers/kmc_personas/

35. Scenario

A method to capture a description of a sequence of events and activities that occur within a specific context and which can involve other agents such as intelligent technologies, people or animals.

Description

Scenarios consist of a setting or stage and one (or more) actors with personal motivations, knowledge and capabilities. Scenarios describe the actions and activities of each persona in context, including the customer's goals, plans, and reactions.

Envisioned scenarios can be used to brainstorm new ideas, refine and fine-tune design concepts and to raise questions about the assumptions behind the scenarios.

The method of scenarios is very widely used in automotive design, but there has been a research shift of focus to the role of emotions in automotive scenarios. Drivers' emotional states are likely to be influenced by various items of information arriving from digital technologies, with possible impacts on behaviour and safety. Affective scenarios specifically describe situations where the greatest positive and greatest negative emotions are anticipated to occur.

SCENARIO
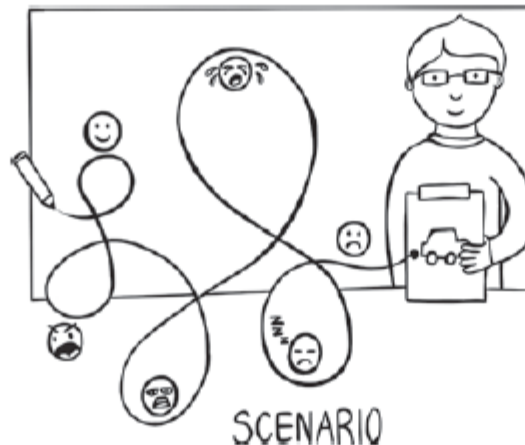
Purpose
To facilitate a comprehensive understanding of the human experiences which occur within a given environment in relation to a specific set of activities.

Input
Design Idea or Design Concept.

Participants
Customers.

Method Info

Time	●●○
Effort	●●○
Staff	●●○
Cost	●●○
Time perspective	**Present/Past/Future**
Setting	**Independent**

Steps

Before the workshop

1 **Setting boundary conditions:** These will be determined by the specific nature of the design project you are working on. For example, are you targeting the general public or specific age ranges (i.e. Generation Y or Z)? Is the intended geographical coverage constrained to UK residents only or also specific overseas markets? These are all examples of boundary conditions.

2 **Identifying key driving forces:** Triangulate with other methods such as surveys, interviews or workshops to collect qualitative data which will help you identify a set of 'key driving forces' that capture complex situations for your scenarios.

During the workshop

3 **Writing the scenarios:** Present a summary of your qualitative data collected from interviews, workshops or surveys to your colleagues. Work with your colleagues to compile the scenarios. Each scenario is required to depict the viewpoints and emotional responses of the associated persona. Write a storyline activity for each scenario that can be performed by following the narrative criteria: 'what is done', 'where', 'by whom and when', 'by what means' and 'in what way'. Aim to write the storyline in a neutral tone, avoid technical terminology and keep a similar length of narrative for each of the scenarios.

Outcome
Detailed descriptions of important automotive contexts and activities, including insights into what people experience and into the emotions involved

Related Methods
Surveys, Interviews, Observations and Co-Design workshops can be used to collect data that will inform the creation of scenarios.

Resources
Kyungjoo Cha. Affective Design Scenarios in Automotive Contexts. PhD Thesis, Brunel University.

15. Customer Journey

A method for describing and visualising an interaction experience including the different touchpoints that characterise the interaction.

Description

A Customer Journey map is a visual interpretation of the overall story from a customer's perspective of their relationship with an organisation, brand, service or product over time and across channels.

Customer Journey maps provide a bird's eye view of the interactions that make up a customer's experience including complexity, successes, pain points, and emotions.

A Customer Journey map can be used for your own empathy work, or to communicate your findings to others.

A Customer Journey map should include the following elements:

Personas: the main characters that illustrate the needs, goals, thoughts, feelings, opinions, expectations, and pain points.

Timeline: a finite amount of time (e.g. 1 week or 1 year) or variable phases of the interaction.

Emotion: peaks and valleys illustrating frustration, anxiety, happiness etc.

Touchpoints: customer actions and interactions (the WHAT).

Channels: where interaction takes place and the context of use (the WHERE).

Purpose

To understand your customer's interaction experiences with a product, system or service and to identify design opportunities.

Input

Customer data from other methods (Interviews, Focus Groups, Observations etc.).

Participants

Representatives of as many as possible of the agreed stakeholder groups including Customers, Senior Managers, Market Researchers and Designers.

Method Info

Time	●●○
Effort	●●○
Staff	●●○
Cost	●●○
Time perspective	Present/Past
Setting	Independent

Steps

Before

1 **Research:** Collect any customer insights you might have and bring together everyone who has knowledge of the customer and their experience to ensure that you've got the complete picture.

During the workshop

2 **Run:** Ask participants to individually write down all the steps they take when interacting with your product/system on a timeline. Encourage them to include information on how they interact with other technologies or other people during this experience. For each step of the experience, encourage participants to include their thoughts and expectations.

3 **Collect & Analyse:** Once the basis of the customer journey map is complete, question the customers about their emotional experiences throughout their interaction. Ask them to describe how the interaction with the car is making them feel, and to think about different factors that influence those feelings. Document these in the journey map as they will highlight weak points in the customer's journey and help you identify design opportunities.

Outcome

A better understanding of your customers' needs in the form of design opportunities that address your customer's 'pain points' in their interactions with your product.
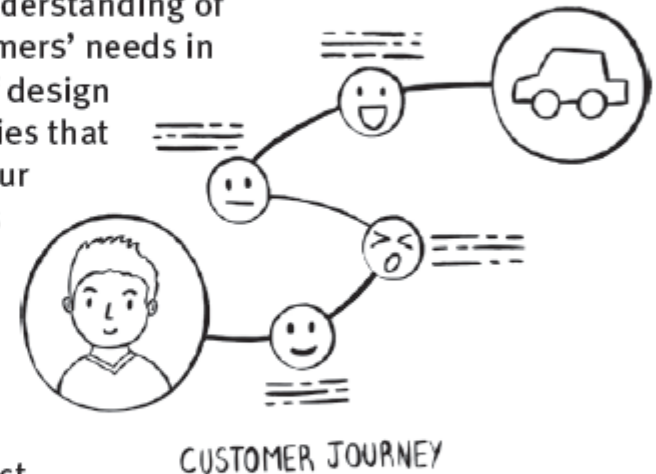
CUSTOMER JOURNEY

Related Methods

Scenarios, Storyboards

Resources

How to create a customer journey map article on: https://uxmastery.com/how-to-create-a-customer-journey-map/

17. Design Fiction

A method that involves the construction of a narrative to immerse an audience in a future experience that provokes emotional responses.

Description

Design fiction is a speculative method that allows you to visualise and materialise future automotive scenarios and concepts. Through this method, you can explore, prototype and test these futures.

Design Fiction uses fictional narrative scenarios to envision and immerse your customers in a future automotive concept, product or service. These scenarios can be used to raise questions about possible automotive future concepts and technologies. These can take the form of prototypes.

Design fiction is a way to create compelling visions of the future without any constraints (such as money, current technological capabilities etc) and to provoke a dialogue about what could or should be possible.

DESIGN FICTION

Purpose
To discover the 'unknown unknowns' of a future automotive concept.

Input
Design fiction narrative (whether in the form of a video, animation, written story, presentation, interactive prototype) to immerse the participants in the future experience you are designing for and suspend any potential disbelief.

Participants
Customers, Design team.

Method Info

Time	●●●
Effort	●●●
Staff	●●○
Cost	●●○
Time perspective	**Future**
Setting	**Independent**

Steps

1 **Plan:** Choose the nature of your design fiction prototype, according to what you are designing for. This will be a tangible design from the (near) future that the participants could interact with during your design fiction workshop. This is called a 'diegetic prototype' and could take the form of a short film or a product. For example, if you want to explore how people would interact with autonomous vehicles in the near future, your diegetic prototype could be a 'Quick Start Guide' manual for an autonomous vehicle that describes the things car owners might do first and do often with their first self-driving vehicle. You might need to run a co-design workshop with your design team to help you design the diegetic prototype.

2 **Workshop:** Organise a Co-Design workshop with participants (representatives of your customers). Allow them to interact with the design fiction prototype and then give them a design task to collaboratively work on.

3 **Analyse:** Collect the various design concepts from the groups and run a debrief session to further explore the design concepts created by the participants.

Interactions Behaviours Metrics   Beliefs Values Meanings

Outcome
Customer feedback on future concepts or technology in a human context (rather than engineering-driven scenarios).

Related Methods
Cultural Probes, Co-Design and Prototyping (can be used for the construction of the design fiction narrative/prototype).

Resources
Design Fiction for the Interaction Design of a Self-Driving Car: http://www.liamwoodsdesign.com/near-future-laboratory-research

Design Fiction. A Short Essay on Design, Science and Fiction: https://drbfw5wfjlxon.cloudfront.net/writing/DesignFiction_WebEdition.pdf

47. 5 Whys

A method based on repeated application of the question "why?" to extract deep explanations of customer beliefs, values and motivations.

Description
The "5 Why's" method is an interview method that creates opportunities to delve deep into causes, beliefs, values and motivations.

As a challenge arises it is easy to focus on the symptoms rather than the root causes that created those symptoms, thereby missing the opportunity to reveal the opinions motivations and needs of your customer.

5 WHYS

Purpose
To get to the emotional and subconscious roots of an issue, and to extract evidence of the underlying beliefs, values and motivations.

Input
Design Idea or Design Concept.

Participants
Customers.

Method Info

Time	●○○
Effort	●○○
Staff	●○○
Cost	●○○
Time perspective	**Present/Past/Future**
Setting	**Independent**

Steps

1   **Define:** Discuss with the team the challenge, concern or issue you will be investigating. Write a brief, clear statement that you all agree on.

2   **Utilising the statement, ask "Why" or "Why is that?" (Why #1).**
For example:
1. **Why** did your car stop? (Why #1) – Because the wheel broke.
2. **Why** did the wheel break? (Why #2) – Because I didn't go to the mechanic this morning.
3. **Why** didn't you go to the mechanic this morning? (Why #3) – Because I forgot.
4. **Why** did you forget? (Why #4) – Because my phone reminder didn't show up.

Repeat for Whys #3, #4 and #5, as well as any more that are needed. Repeat the whole process as many times as necessary to determine potential root causes (especially if the root cause is something you may not control).

3   **Collect & analyse:** Analyse the information you have gathered to identify common themes and patterns.

Outcome
The root cause of a challenge, concern or issues your customer is facing.

Related Methods
Laddering

Resources
5 Whys: Getting Quickly to the Root of the problem on MindTools https://www.mindtools.com/pages/article/newTMC_5w.htm

30. Love/Break up Letter

A method that collects self-reported information from participants about their relationship with a product.

Description

The Love Letter/Break up letter is a method that allows customers to express their sentiments about a product or a service using a medium and a format that are immediately understood. Instead of writing to a person, participants are asked to 'personify' the product, system or service and to write a personal message to it.

A personal letter written to a car or a specific feature of it, can reveal insights about what customers value and expect from their cars.

The Love Letter gets at the heart of what people feel during special moments of connection with the car. Descriptions of what elicits delight, infatuation, and loyalty are common themes in love letters.

The Break up Letter provides instead insights about how, when, and where a relationship with a car has broken down. Such letters can allow insights into why people abandon a particular car brand or a particular car model.

When writing a Break up Letter, people will usually share information about what new product they are now happy with, and what the characteristics and features the new product has that the abandoned product does not.

Purpose
To reveal and describe the relationships people have with the cars in their lives.

Input
No prior artefacts required for method execution.

Participants
Customers
Small groups (4 to 6 people).

Method Info

Time	●●○
Effort	●●○
Staff	●○○
Cost	●○○
Time perspective	**Present/Past**
Setting	**Independent**

Steps

Before

| 1 | **Plan:** Recruit participants for a group Love/Break up letter in a one-to-one interview setting or as part of a workshop. |

During the workshop

| 2 | **Run:** Ask participants to spend no more than ten minutes writing a letter (usually, longer timeframes will make participants over-think its contents) and then ask for volunteers to read their letters out loud in front of the other participants. |

| 3 | **Collect & Analyse:** Analyse your observations and notes using frameworks such as AEIOU or clustering, to formulate insights, questions, and theories. |

Outcome

Insights into the customers' perceptions by eliciting feelings of admiration, appreciation, frustration or aversion based on real-life experiences and interactions.

LOVE/ BREAK UP LETTER

Related Methods

A Love/Break up Letter can be used as a standalone method but can also be used as part of an Interview or a Focus Group.

Resources

Love/Break up Letter 'How To' by Atomic Object: https://spin.atomicobject.com/2017/06/29/design-thinking-activity-love-breakup-letter/

7. Co-Design

A method that actively involves all stakeholders in generating ideas and collaboratively creating concepts.

Description

A Co-Design workshop is a form of participatory design that brings together a variety of creative design methods into an organised session for participants to work with the design team members.

Co-Design can be used:
- To ideate and establish design implications when exploring the design of new products.
- To collectively review, offer feedback, and contribute insights for design iteration and refinement when evaluating existing design concepts.

A Co-Design workshop can employ numerous design methods, such as picture cards (to get the participants engaged with the design brief), Role Playing (to understand the challenge and empathise), Brainstorming and Crazy 8s (for ideation), and prototyping.

CO-DESIGN

Purpose
To convene a group of people you are designing for and actively bring them into the design process.

Input
Low-fidelity sketching supplies: post-its, markers, pens, timer, snacks.

Participants
Customers.

Method Info

Time	●●○
Effort	●●●
Staff	●●○
Cost	●●○
Time perspective	**Present/Past/Future**
Setting	**Independent**

Steps

1 **Plan:** Define the exact scope of what to ask participants to design during the workshop and allow for sufficient time for the activity. According to your design goals, decide which method(s) to apply during your co-design workshop.

2 **Recruit & Group:** Recruit participants and group them into teams in advance, ensuring the groups are mixed (i.e. not all customers in one group, not all stakeholders in one group, not all design team members in one group).

3 **Workshop:** Brief participants on the scope and aim of the co-design session. The brief may include a specific product to improve, or a general challenge you want participants to address (the specific scenario or customer journey faced by your customers).

4 **Collect & Analyse:** Allow each group to present (pitch) their designs and for the entire group to discuss any common themes that emerged. Document the ideas and sketches and discuss these further with the design team.

Interactions Behaviours Metrics Beliefs Values Meanings

Outcome
New ideas based on direct input from your customers can help to clarify that your design(s) meet the needs of your customers.

Related Methods
Most of the methods in this book can be used as a part of a Co-Design workshop (apart from the Usability Evaluation Methods).

Resources
A Co-Design workshop to elicit what feels natural when interacting with an automobile's secondary controls on: https://www.tandfonline.com/doi/abs/10.1080/14606925.2018.1395228

HCD Triangulation

**No Right or Wrong Method!**
For each given design project, there is no right or wrong method. The selection of methods is based on YOUR context and frame of reference.

Methodological Triangulation
Improve the validity of your work by combining
MORE THAN ONE method in one study.

Aim to apply at least three methods which, between them, can capture...
- What the customer SAYS
- What the customer DOES
- Contextual, physical, perceptual and cognitive informatio

Contextual, physical, perceptual
and cognitive information

What the customer SAYS
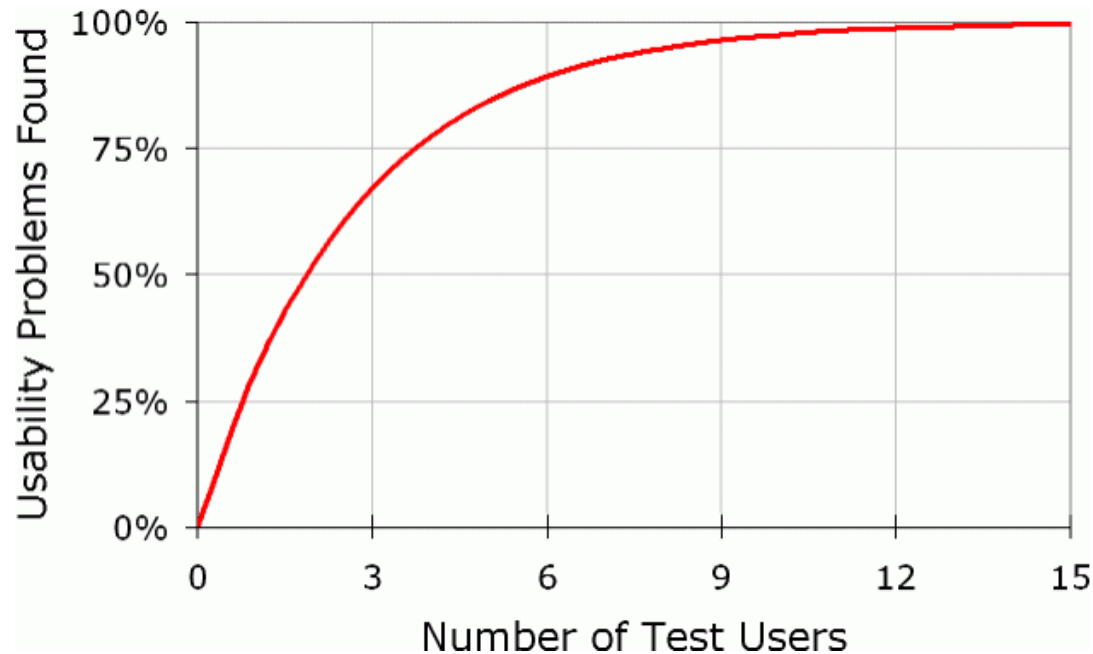
Human Centred Design

What the customer DOES
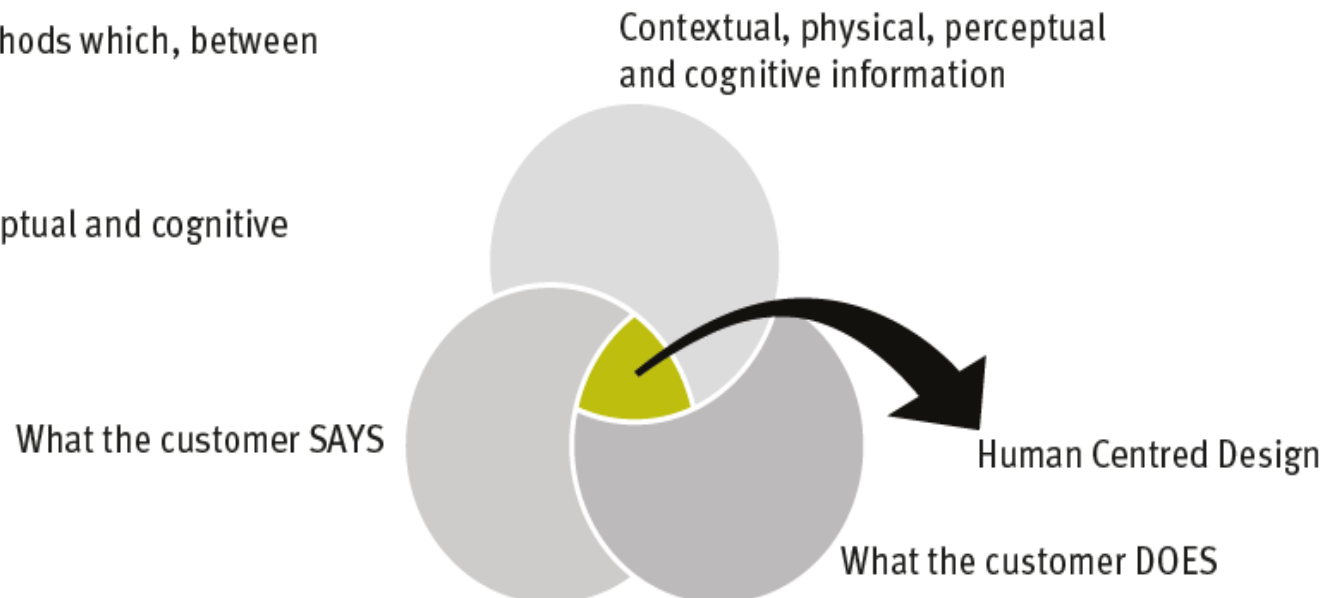
HCD Sample Sizes

The number of usability problems found in a usability test with n users is $N(1-(1-L)^n)$

where N is the total number of usability problems in the design and L is the proportion of usability problems discovered while testing a single user.

Typical values of L averaged across a large number of projects are approximately 31%.

Nielsen, J. and Landauer, T.K. 1993, A mathematical model of the finding of usability problems, Proceedings Of ACM INTERCHI'93 Conference, Amsterdam, The Netherlands, 24-29 April, pp. 206-213.
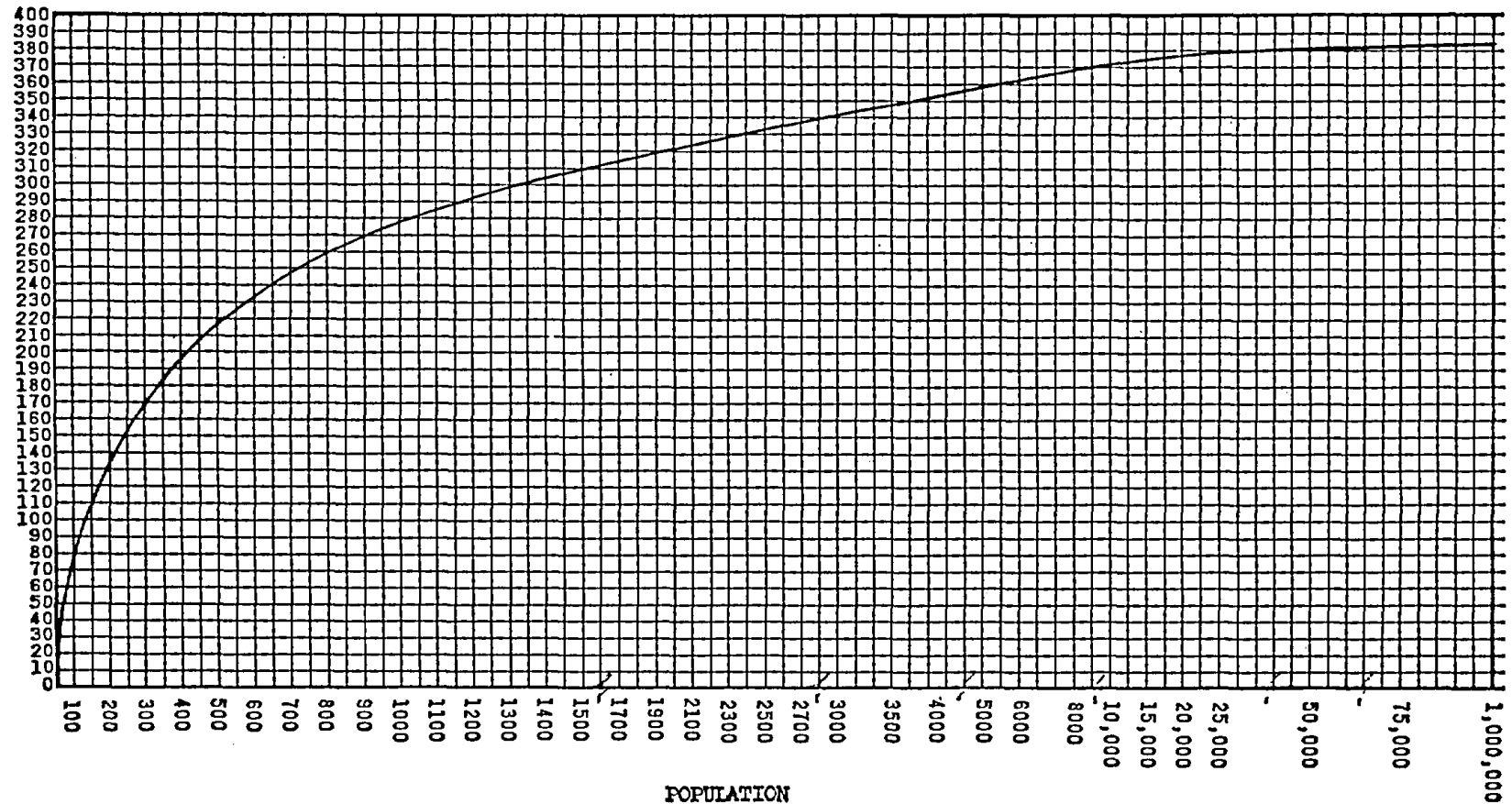
HCD Sample Sizes

Statistical sample sizes can be directly estimated based on the assumed population size and the confidence level desired. The curve below presents the required sample with respect to the assumed population at a 95% statistical confidence level.

Figure 1. Relationship between sample size and total population

Krejcie, R.V. and Morgan, D.W., 1970, Determining sample size for research activities, Educational And Psychological Measurement, Vol. 30, No. 3, pp.607-610.

HCD Sample Size Rules Of Thumb

Nature Of The Design Question	Typical Stage Of Design Process	Measurement Scale	Minimum Number Of Participants
Identifying	design ethnography concept generation interaction design accessibility testing usability testing prototype testing	Nominal Scales	5 to 7
Comparing	human factors assessment safety systems testing consumer testing	Ordinal, Interval or Ratio Scales	30 to 60

Thank you.