ES 115
Design, Innovation and prototyping

3 Design Process

Design and Innovation Centre

IIT Gandhinagar

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Recap

- Product design >> value addition
- Evolution of industrial products

- Drivers of innovation *(people, technology, business)*
- Types of Innovation

Contents for today

Design Process (3 stages)

Stage 1: Data collection

A product ..

- **Interacts** with you
- **Participates** in activities
- **Influences** lifestyle

Whether it's the maker's choice or not !!

Therefore we need design it consciously to do so..

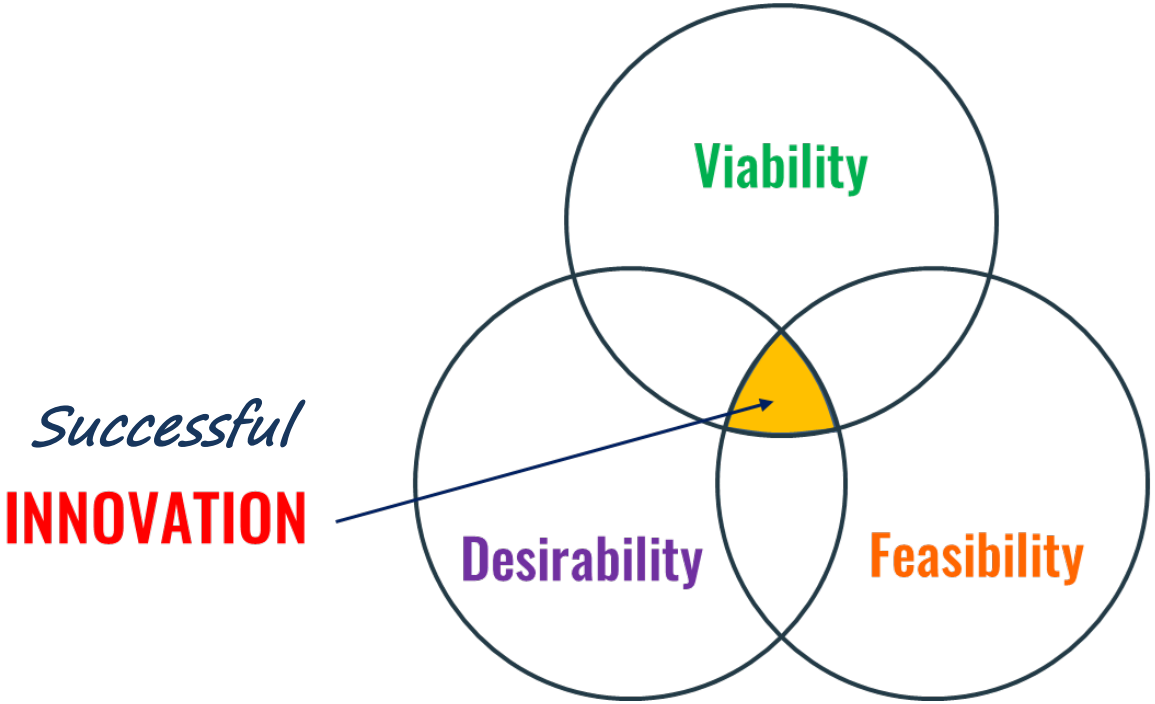
If we want a well-designed product…

How and where do we start?

A good brief

Aim for more than one factor out of the three

- **User** (Desirability)
- **Business** (Viability)
- **Technology** (Feasibility)

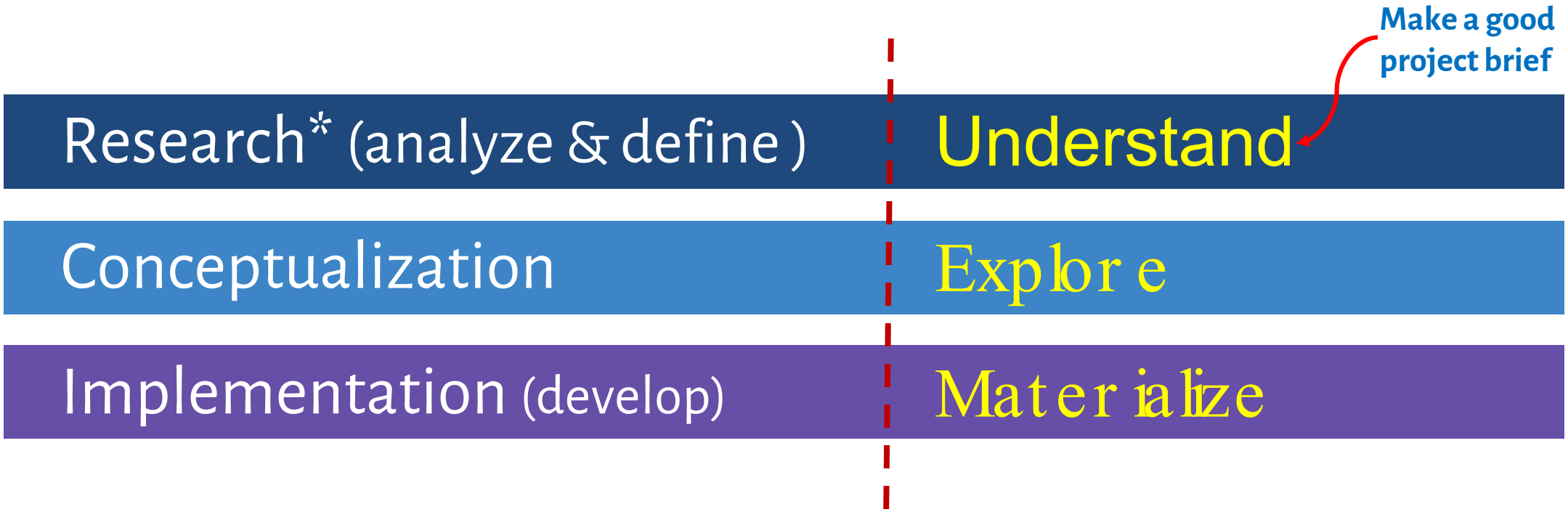


A good brief

Study all the three factors:

- ***User (Desirability):*** profile, tasks, ergonomics
- ***Business (Viability):*** brand, competitors, selling proposition, pricing, point of sale(POS)
- ***Technology (Feasibility):*** features, environment, manufacturing, evolution

Three main stages of design process



* Design research is quite different in nature as compared to science or technological research. It involves contextual study of user needs, market research and product/ technology and any other contextual study required for the project.

Three main stages of design process

- At each stage: we will ***diverge*** (creativity) and then ***converge*** (objective thinking)
- ***Business (Viability):*** brand, competitors, selling proposition, pricing, point of sale(POS)
- ***Technology (Feasibility):*** features, environment, manufacturing, evolution

Phase 1: Design research

Design research >> data collection and analysis

Goal : ‘make a **good project brief’**

……

A problem defined well…. is half solved

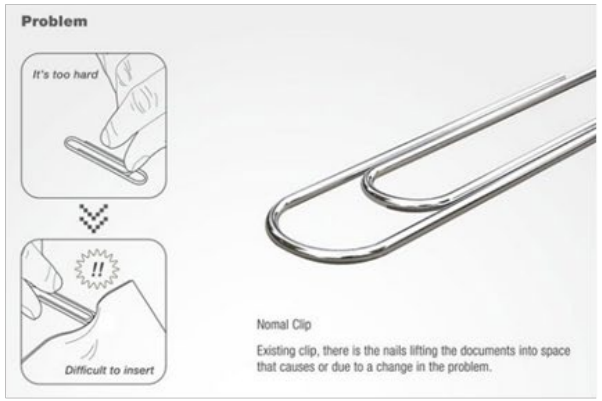
Case study – paper clip

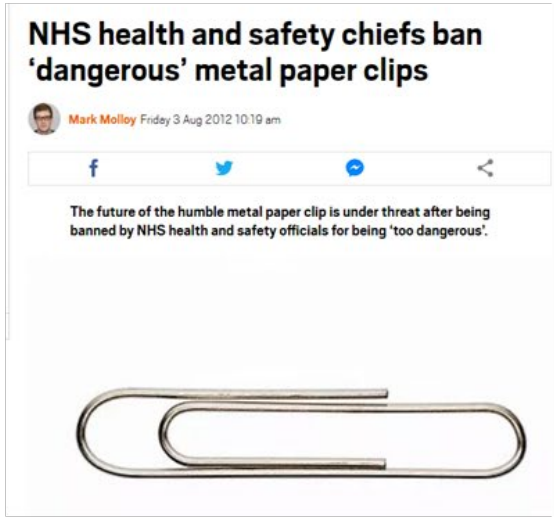
User study

Case study – paper clip

Social profile

Aesthetics

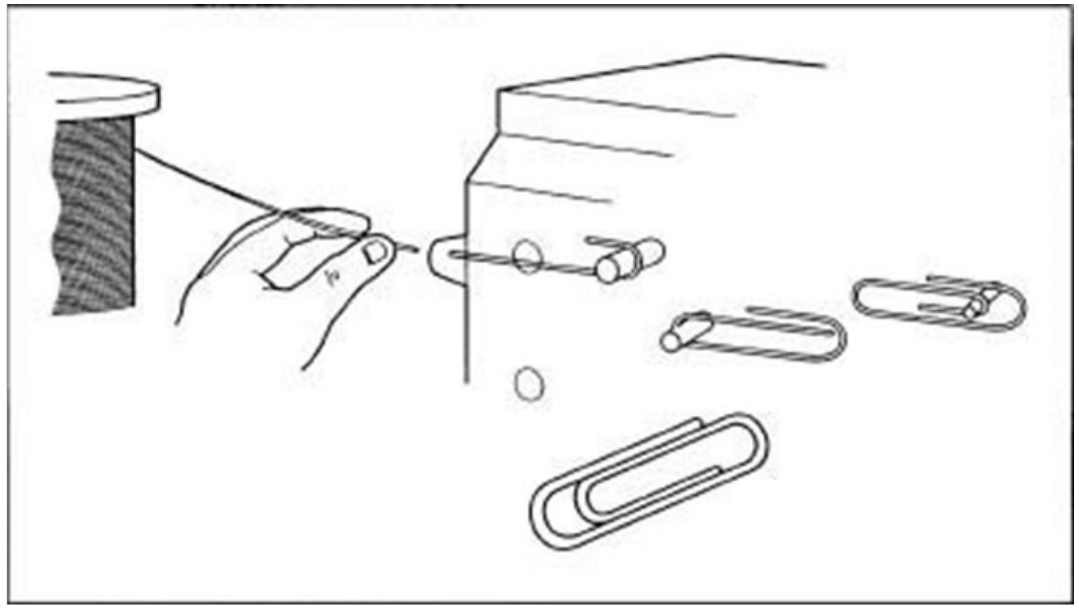




Interaction **(Task Analysis)**

Product/ technology study

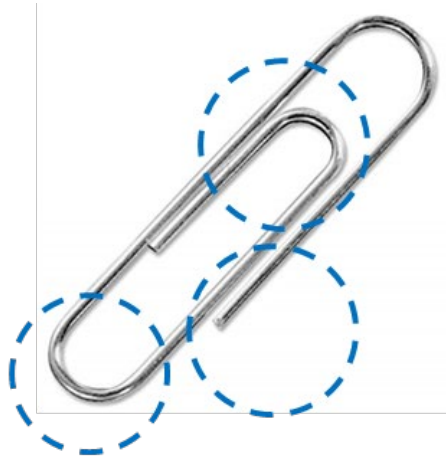
Case study – paper clip



http://www.madehow.com/Volume-7/Paper-Clip.html

https://www.youtube.com/watch?v=OsDdmDFDYHA

Manufacturing

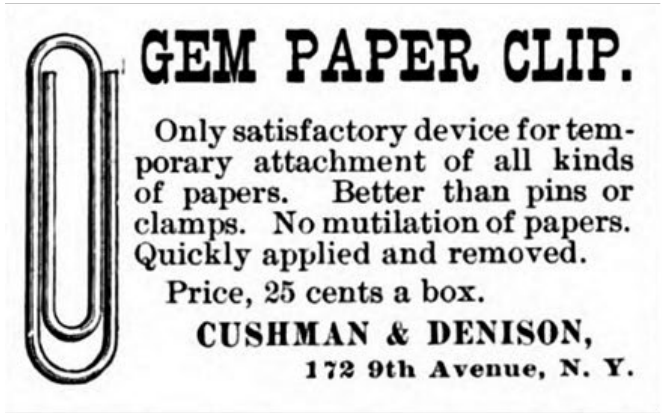


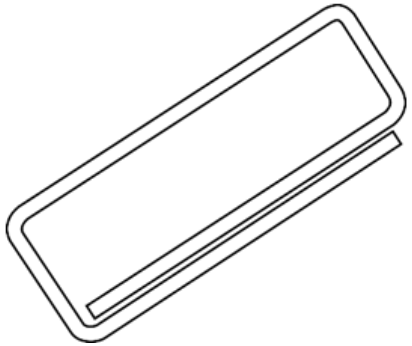
Features–advantages, disadvantages

Similar products

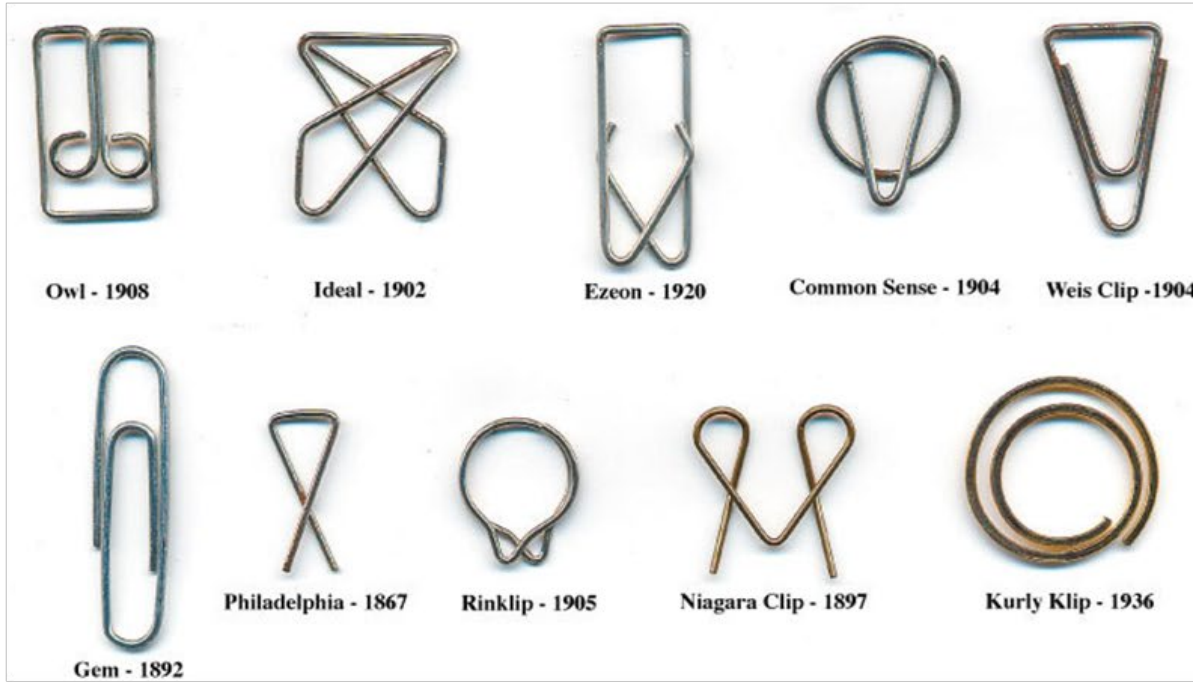
Product/ technology study

Case study – paper clip





Evolution



https://www.officemuseum.com/paper_clips.htm

Business/ market study

Case study – paper clip

Pack of 160
Rs 299/Pack

Pricing

Study of POS

Competitors

Define the brief

Analyze and identify opportunities under each head

- User
- Technology
- Business opportunity

Leads to the next phase : **Ideation**

Case study – paper clip

Design process in a gist

Three stages of design process are:

1. Research* (analyze & define)
2. Conceptualization
3. Implementation (develop & detail)

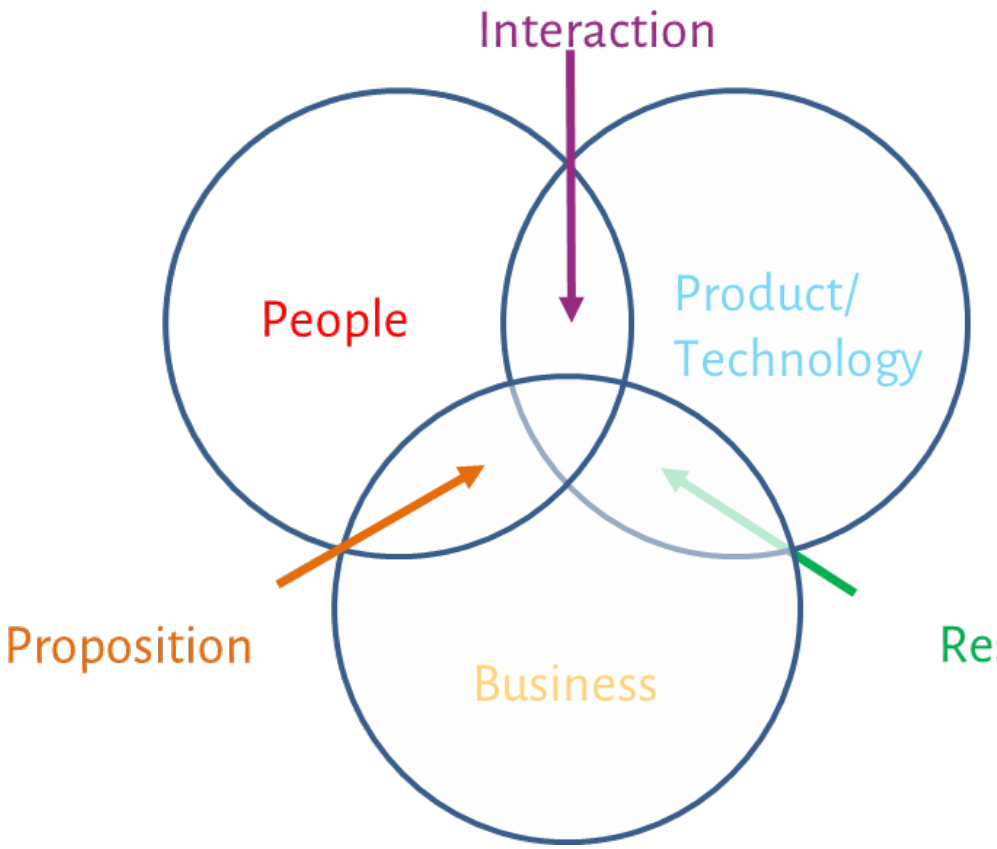
First stage : to analyze data and define the brief.

A problem defined well is half solved.

Data collection

Story: the lost key

Data collection: for DIP project



Stage one: Understand

- Define the ‘***purpose’ / need statement***
- Data collection for intended ***users and their needs*** for the concerned purpose
- Existing products/ technology used for the purpose
- Data analysis to identify design opportunities
- Define a well-rounded project brief

Data collection methods

Methods of data collection: for design

- **Fly on the wall**
- **Shadowing + observation, probing**
- **Questionnaire / Survey**
- **Desk research**
- Focus group discussions

Fly on the wall : find the trigger

- **Observe and notice** the behavior and issues of people are doing without them noticing you
- May require to **play detective**
- Helps in **finding leads** for further research

Shadowing + observation, probing

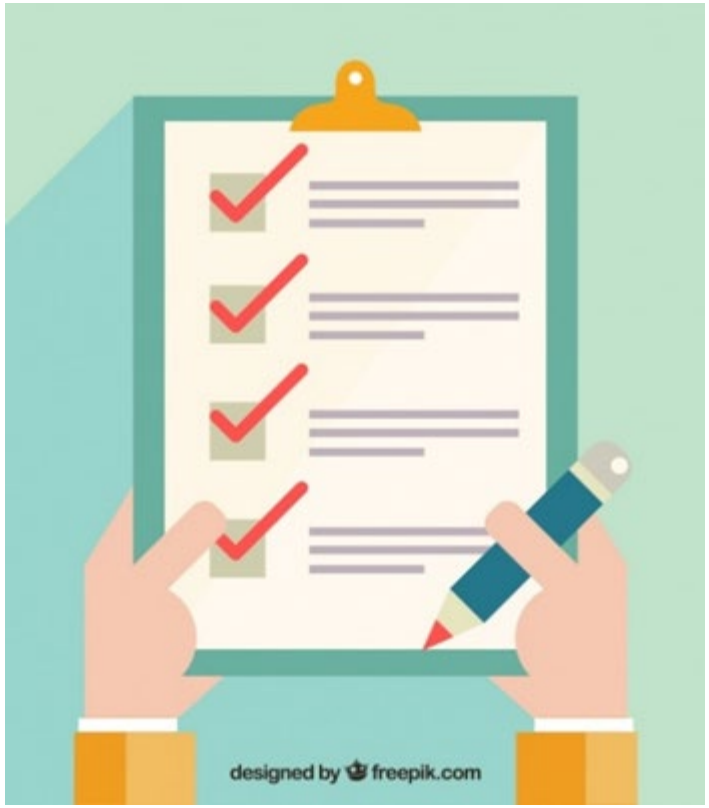
- **Follow** a person without interfering
- **Notice** routines, activities, tools etc.
- **Observe** the task >> goal
- Study user behavior

Shadowing ... >> Task analysis

- Task analysis >> process of breaking down a complex job into smaller, manageable steps
- May interrupt and **ask** about particular action
- Note problems for each task/ subtask

Interviews

- User, subject expert, stakeholder
- Helps establish / strengthen arguments
- Recommended: interviews in person, and fill the questionnaire yourself
- Structured data



https://www.researchworld.com/fundamentals-of-questionnaire-writing/

Desk research

What do you find out?

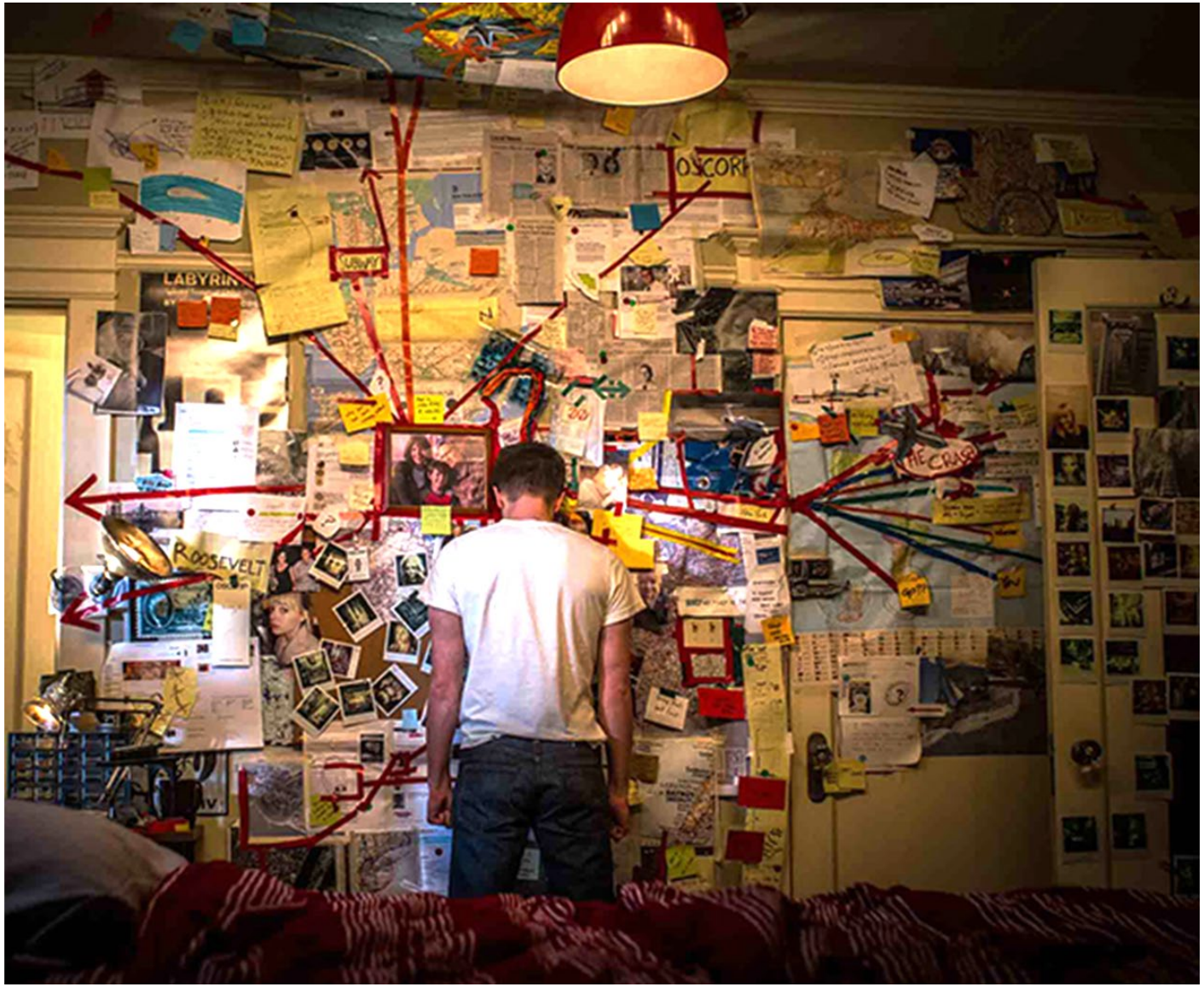
- Latest and upcoming technology/ trends w.r.t. the **purpose**
- Social and environmental concerns
- Existing solutions (prior art) for the purpose

Secondary sources

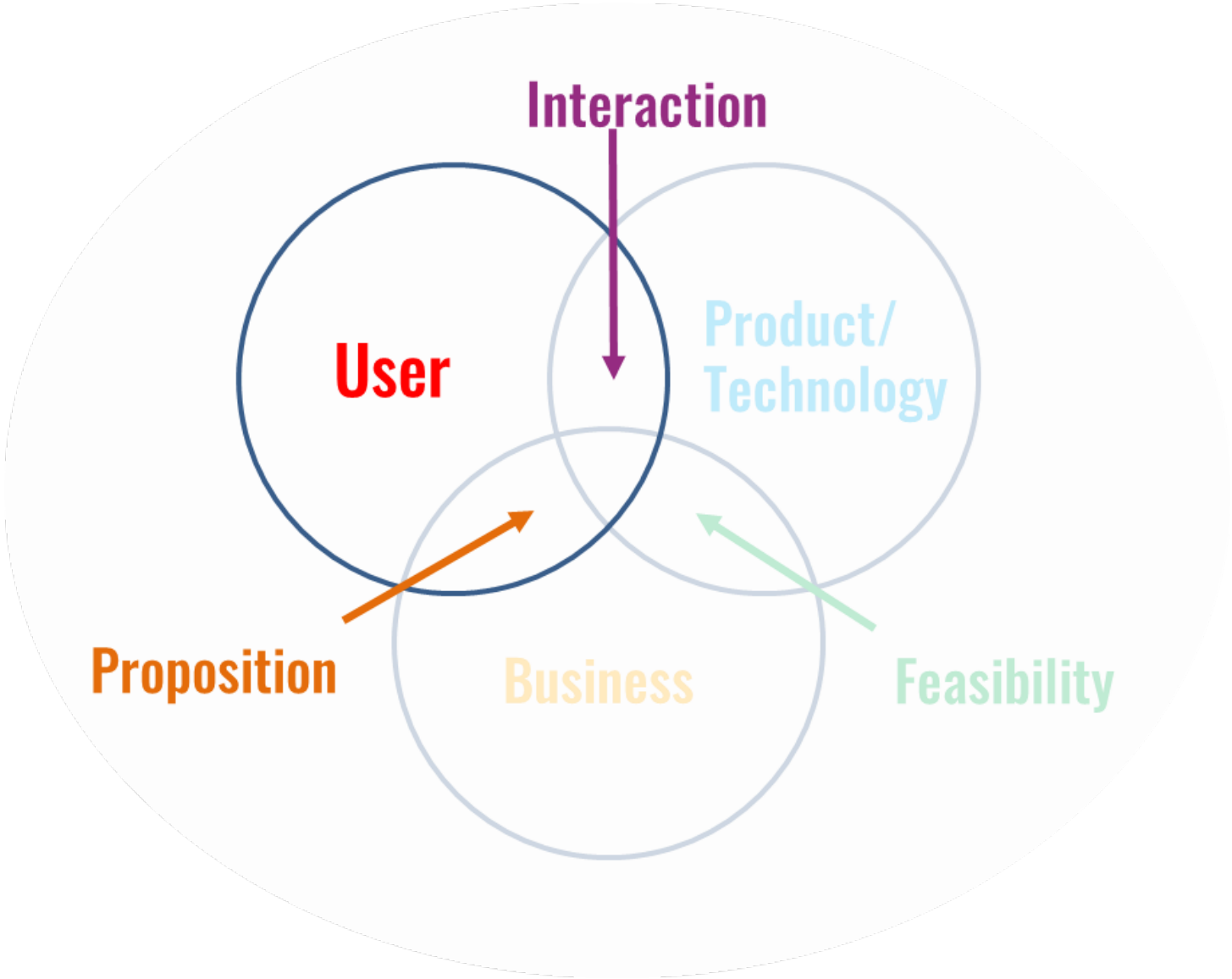
- Articles
- Research papers

What next?

Data analysis



Data analysis



Story: My car does not like vanilla ice-cream

Analyse interaction

- **What** is the function? (Function, Working principle)
- **Who** is going to use the product? (User profile)
- **Where** will it be used? (Environment/ Context)
- **When** will it be used (Specific time/ Season/ Before or after a specific task)
- **How** will it be used? (Action sequence/ interaction)

Documenting a process

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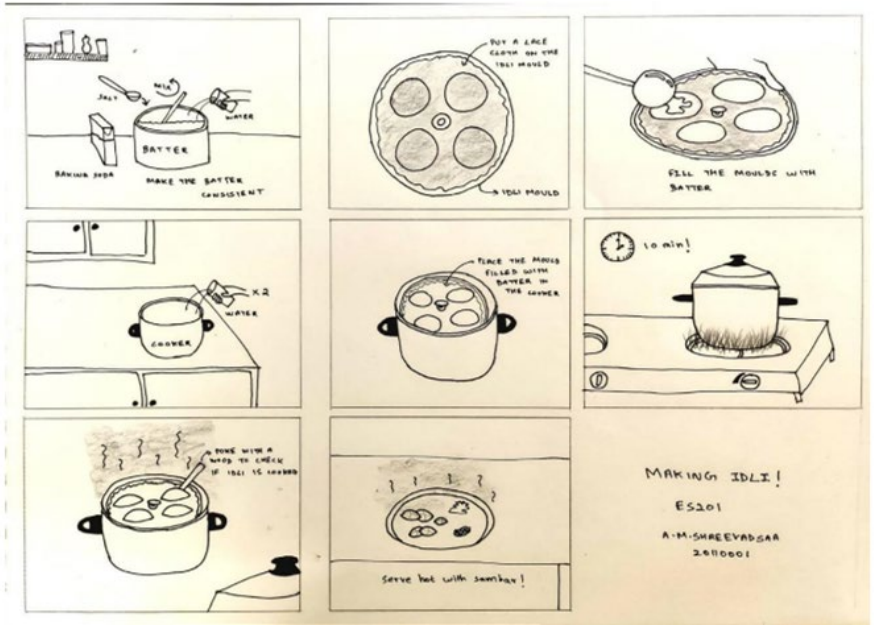
1. **Storyboard** : (Dish – **Idli**)



- Important ingredients
- Important steps
- Tools and equipment used
- Human intervention is required in the process?
- Cooking process (science)
- Use five senses for decision making
- Critical points (process can go seriously wrong)

Analyse technology (as much as possible)

- ***Existing products*** for the same need; their strengths and weaknesses
- Required ***material properties*** (refer to design activity)
- Define ***required features*** for an effective user product interaction

Project brief

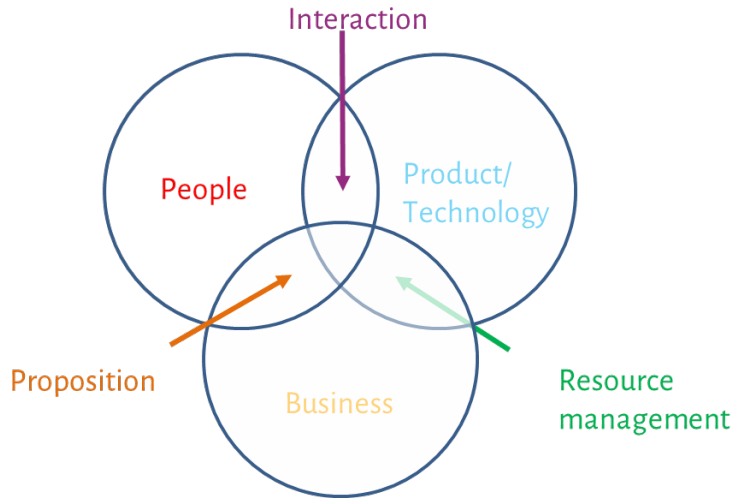
Contents of the project brief

- **Insight:** Share your most relevant observation from your research.
- **Therefore:** Explain the conclusion you've come to based on the insight.

Project brief

End result of data collection and analysis is a brief; support with context and background as required

- Who is the **user**?
- What is the **desired interaction** between product and user?
- What is the **value proposition**?



Summary

- Stages of design process
- Define the ***'intent' / need statement'***
- First stage of design project: Data collection and analysis
- Methods of data collection
- Data analysis to identify ***design opportunities***

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Next time... ‘Forming a project brief’