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1 PROBLEM FORMULATION (1)

Problem formulation consists of

1) Need - objective - constraint - criteria - needed information - safety

(a) For a water purifier:

NEED:

- Device to purify tap water
- Easy to use
- Duration to filter should be less than 45 min
- Easy to maintain (clean and service)
- Durable (should last long)
- Economic (should be cheaper in the long run)
- Light weight
- Should have manual and automatic modes for easy use.

(b) Constraints

- Weight less than 25 kg.
- Capacity more than 5000 ml.
- Duration of filtering less than 45 min

(c) Criteria

- Easy to use.
- Easy installation and maintainence
- Effectively cleans water
- Retaining good minerals and purify maximum

(d) Needed information

- Model/Technology used
- Does it need external purifier or not
- Motor power.
- Voltage

(e) Problem at hand.

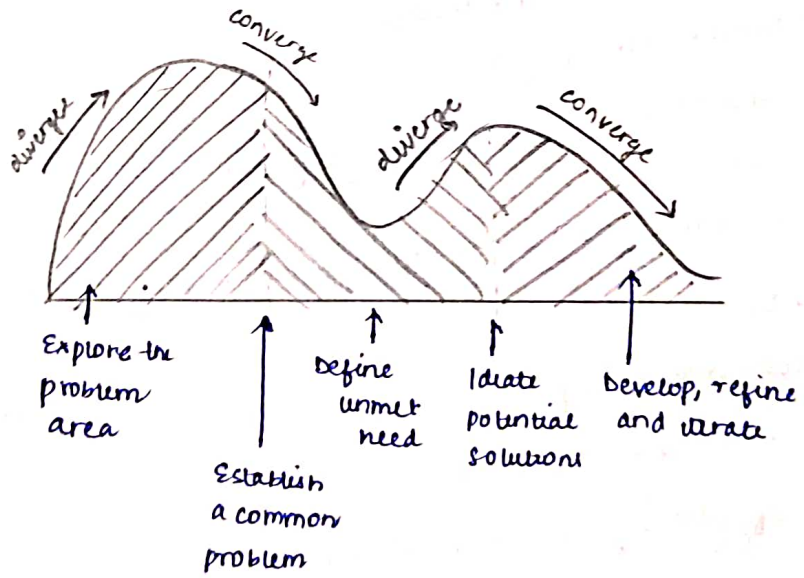
- To obtain clean water
- Time saving

(f) Safety

- Kid friendly - safe to use and .
- Stop purifying if tank opened manually .
- If any malfunction occurs, it stops working .
- Noise reduction by silencers .

2) HUMAN CENTERED DESIGN.

It is an idea that overlays design thinking to ensure that products are actually relevant and beneficial and are adopted by the people.

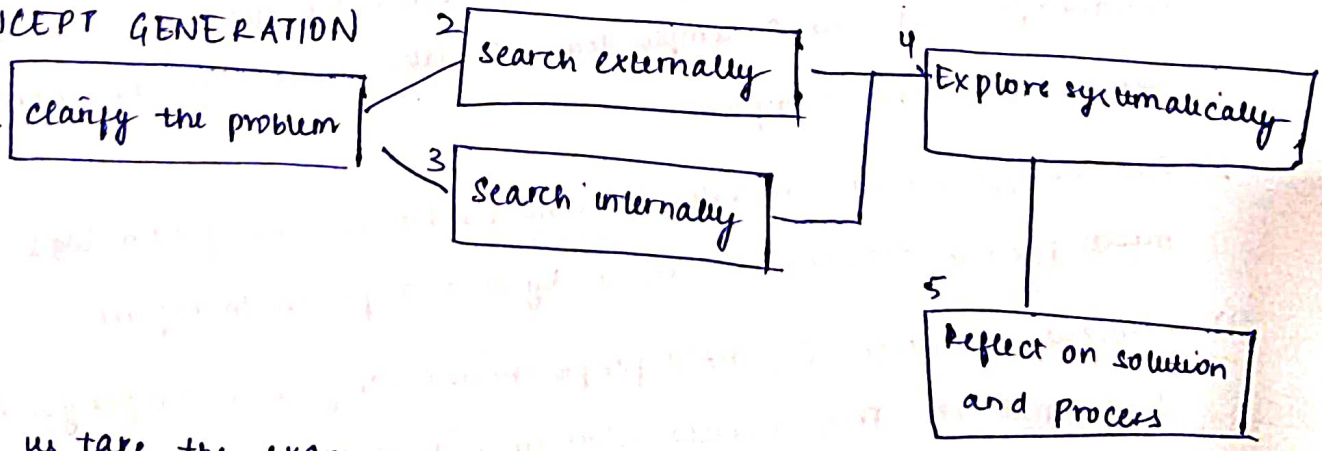


~~Define under this:~~

Ex SWIGGY

- THE PROBLEM : Food delivery :- We can find solutions to late night hunger pangs or big catering parties.
- COMMON PROBLEM : We all have favourite restaurants, some small or some large chains. Not all restaurants have delivery options available. That can happen due to lack of funds or the lack of need.
- UNMET NEED: The need is to have any sort of meal available at the doorstep hassle free.
- POTENTIAL SOLUTION: There can be a ~~ser~~ product linked to a service. We can have restaurants affiliated with the product. The hotel can give their menus and the product (app) can list them. After going through the list, a customer can place an order with the restaurant. Now the restaurant has delivery partner service with the product. The food reaches the customer's doorstep in a jiffy.
- DEVELOP: With time the app (product) can have a variety of options, from cuisines to outlets, it can provide many options. The time taken for delivery can be reduced as well.

⇒ CONCEPT GENERATION



Let us take the example of choosing a faculty in FFCS in our college.

1 We understand the problem: We need to find faculties who teach well, have a good rapport with the students and is interested in their subject to help in studies after class as well.

2) We'll search externally by asking our seniors or reviewing their previous class material and question papers.

3) We'll search internally by noting any personal experience or any observation made by any of us.

4) Now we would classify all the information systematically in the form of a tree or table.

5) After seeing the ~~result~~ information systematically, we can ask our peers for feedback and reflect on the solution.

3) 'HASH' wants to visit our campus. This planning looks like a project planning. We'll consider the following steps:

1) Breaking the work in ~~to~~ set of tasks
2) Developing a list of approvals and milestones
3) Itemizing required resources
4) Checking the plan for consistency.

1) We need to divide the work in a set of tasks. Here HASH is visiting our campus, so we need to accommodate the team, food for the team, commute from the airport to college and visa-versa. We need to send shortlisted candidates list, an oncampus team to take them to the interview venue across the campus.

2) List of approvals and milestones: Whoever has been assigned a ~~task~~, they must have a deadline to abide by and a person to report.

3) Required resources: The HASH people should carry their company's ID and a personal ID. They should also submit the interviewers certificate to show they are eligible to take interviews.

4) Plan for consistency: We should think and analyse is the plan is doable and feasible.

4) EMPATHY MAPPING

Empathy mapping is used to understand the thinking process of the user while buying anything.. It has four pillars - SAY - THINK - DO - FEEL.

Let us consider the example of buying a car.

SAY

- State the price range
- Ask for basic models
- Mileage
- Asks for a test drive
- Which size is the best
- Which ~~model~~ is most reliable
- Salesman's opinion

THINK

- Is this the right brand / showroom ?
- Am I spending too much ?
- Maybe I don't need a car.
- Too many terms which I know nothing about
- Payment mode seems tricky.
- Maybe I should seek more options.

BUYING A CAR

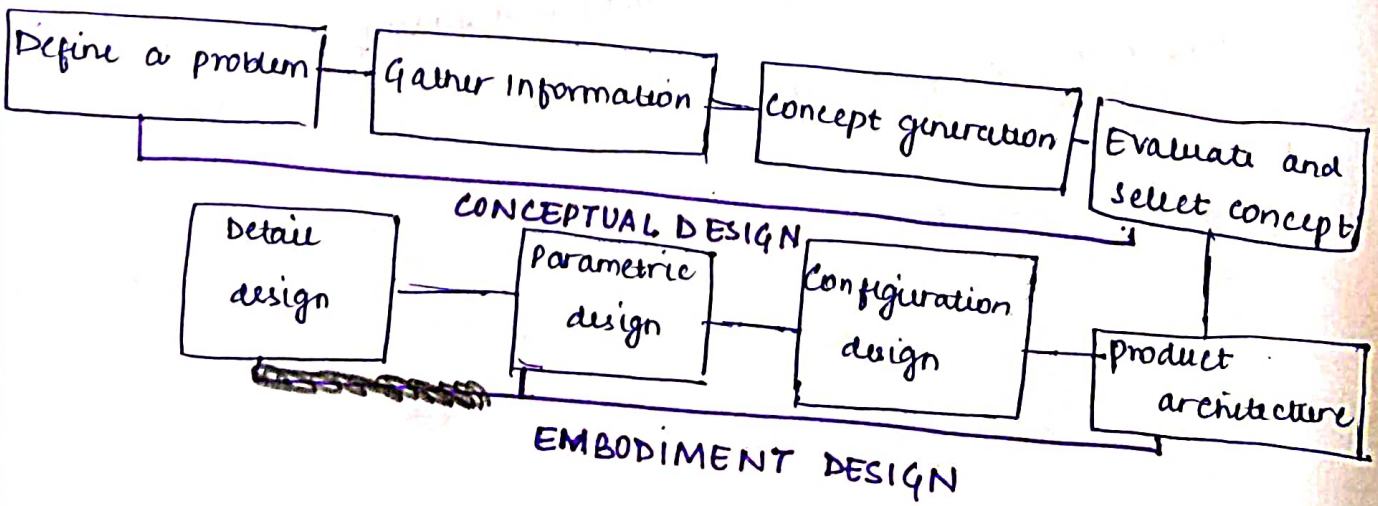
DOES

- Observes the showroom
- Checks online
- Calls a relative / friend
- Compares models
- Ask fellow customers
- Visit multiple times ~~during~~ before making a decision

FEEL

- Confused about making a decision
- Excited for a new car.
- Unsure about the model
- Overwhelmed for ~~make~~ buying a car
- Anxious for making a big purchase
- Happy

5 DESIGN CONCEPT



EXAMPLE : A baby feeding bottle.

1) CONCEPTUAL DESIGN :

(a) Problem definition : We need to design a baby feeding bottle. This has to be a better alternative to the bottles already available in the market. We need to use better plastic and better quality rubber / silicon.

(b) Gather information : Find out about latest PET and plastic polymer patents as well as softest and safest rubber patents. Go-through journals and documents to find surveys of previously available bottles.

(c) Concept generation : Brainstorm and collect data about designing, use, function of the bottle..

(d) Evaluate and select concept : After going through the charts, tables and feedbacks choose the most apt solution to implement. So, the best plastic and rubber.

(2) EMBODIMENT

(e) Product architecture : Finalise the final elements to be added to the bottle.

(f) Configuration design : Make a mock up model to estimate the size and preliminary selection of materials and manufacturing process of the bottle. So it decides the assembly of the bottle.

(g) Parametric design : Finalise ways in which the bottle can fail, boiling-temperatures or extra cooling etc

(h) Detail design : Final bottle (product) with quality, costs, aesthetics and performance as parameters.

X ——— X ——— X ——— X ——— X