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Date : 20-10-2022

Course : DSN 2096

Semester : Fall 2022-2023

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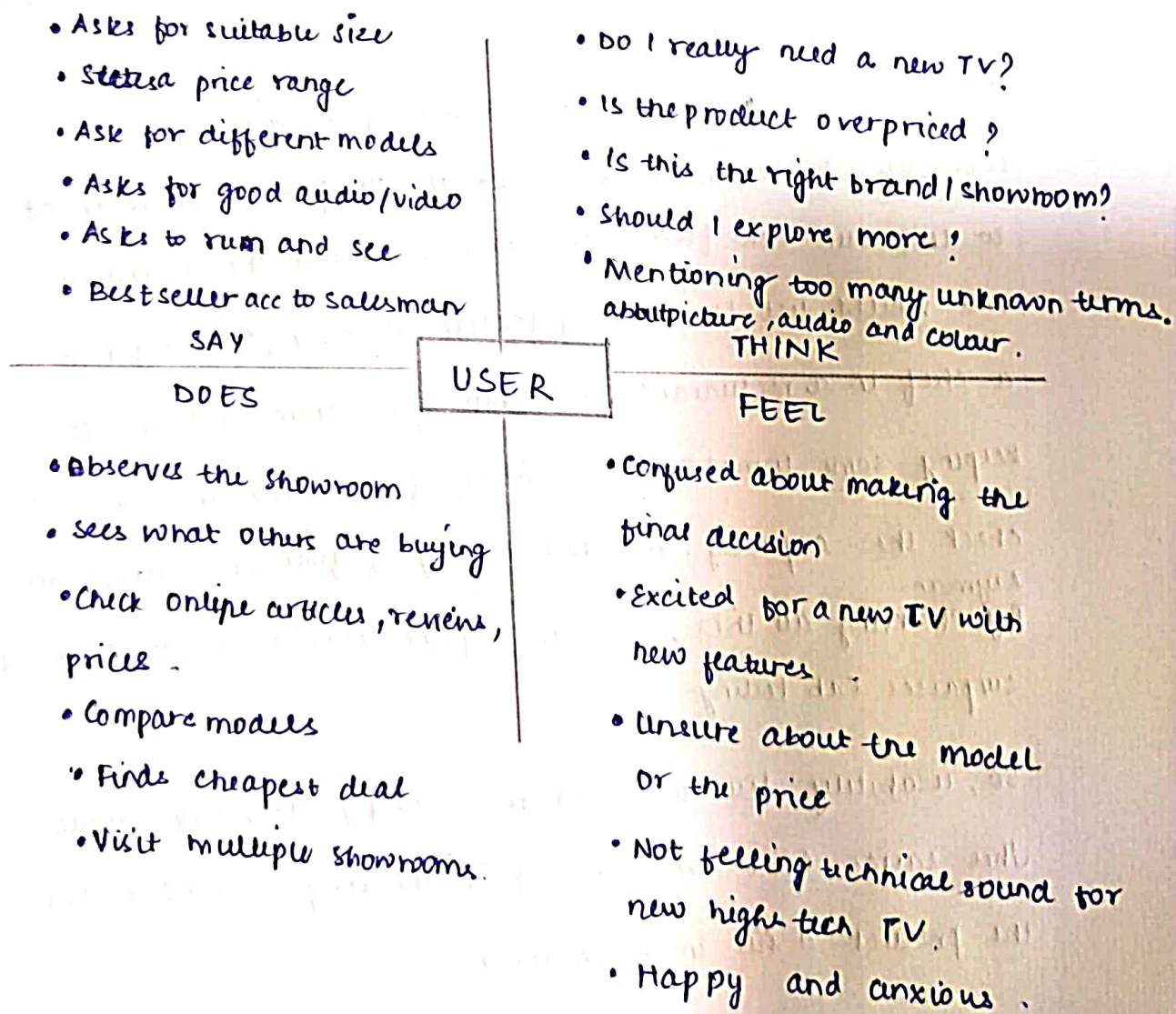
1) a) Empathy Mapping

Empathy mapping is used to understand the thinking process of the user while buying anything.

It has four pillars → SAY - THINK - DO - FEEL.

Here, according to the question, we have to form an empathy map to buy a television.

SAY
- Asks for suitable size
- States a price range
- Ask for different models
- Asks for good audio/video
- Asks to run and see
- Best seller acc to salesman

THINK
- Do I really need a new TV?
- Is the product overpriced?
- Is this the right brand/showroom?
- Should I explore more?
- Mentioning too many unknown terms about picture, audio and colour.

USER

DOES
- Observes the showroom
- Sees what others are buying
- Check online articles, reviews, prices.
- Compare models
- Finds cheapest deal
- Visit multiple showrooms.

FEEL
- Confused about making the final decision
- Excited for a new TV with new features
- Unsure about the model or the price
- Not feeling technical sound for new high-tech TV.
- Happy and anxious.

2(b) Useability Testing

Useability usually wants effectiveness, efficiency and satisfaction with which the users interact and achieve the goals.

So, useability testing is really necessary before launching a product.

(a) Gains insights from the users : The users can themselves test it and tell which functions they like and even share some inputs to improve the product.

(b) eg While surfing a webpage the users who are testing can tell if any new button or page is required or not.

(b) See if the product is meeting users expectations

(c) See if the design is matching to the real world use as well as catering to the business side

(d) Check the ease with which the user completes a task.

Lets say, for example, we are an product engineer at LG. and want to test our new refrigerator. To test the useability of the fridge, we would test it on a potential customer, like a person who cooks or a chef in a restuarant.. we then give them a task, lets say test by keeping some tomatoes in a fridge for a week and check its freshness or check the capacity for a family of four, or settings done by a normal layman.

By observing all this, we can acquire knowledge about the product which surpasses lab testing.

So, usability test is needed to identify usability issues and improve. This saves time and money in the long run and might also make the product a hit in the market.

Now, reliability and safety measures are equally important. In general, there is no distinct line between reliability and safety. Most system must be both. System can be designed in order to be both safe and reliable but it is very rare that both the requirements are equally important. Lets see some examples to understand better.

a) Reliable and safe: Let us consider car air-bags. They protect the passengers when the car senses some collision. This is safe and reliable as even a sudden jerk can sometimes hurt the passengers.

(b) Reliable but unsafe: There are axes in public place trains, metros etc, so that in case of some emergency the passengers could break the windows and save their lives. but it can be unsafe if a person with ill thoughts take over the axe.

(c) Safe but unreliable ; smoke alarms are a great addition to residential and commercial buildings and is helpful too but it is very sensitive so sometimes it gives out false alarm.

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3 (a) DESIGN CYCLE MODEL

The design cycle model consists of six stages:

1) Awareness — Identifying the needs
2) Research — Analysing, researching and specifying requirements
3) Ideate and Plan — Forming ideas and plans.
4) Prototype — Develop a solution
5) Testing and Revision — Test and update
6) Launch — Evaluate the chosen solution

Now, a metaphor concept generation means that concept represents another concept which is similar to the concept to be represented.

For example, a swan chair was created. So this chair approximates the shape of a swan in order to highlight elegance, which the swan is famous for and it means 'The chair is a swan' where chair is the concept to which represents the properties of a swan.

<u>Types of metaphors</u>: There are two types — First order concept generation and higher order concept generation.

So, considering the 'chair is a swan', it means that the chair is tangible, its present. So, we can say that, by metaphor, a new concept can be generated further will be similar to the concept it was assimilated to.

So, this would become a first order concept generation, ~~when the chair doesn't~~

Now first order concept generation is only useful to create a subspecies of an existing object. 'Both the swan and a chair, singularly exists.

But what if an abstract concept is generated by combining multiple abstract concepts; then its called higher order abstract concept.

and the higher order concept generation is the process of generating

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a new concept on the basis of the higher-order abstract concept (5)

For ~~eg~~ example we have ~~snow apples and garlic mustard powder salad~~ ~~p snow apples and~~ white tomatoes and powdered ketchup,

they arent practical, but ~~unitralled~~ ideas.

Now ~~these~~ also have two types.

Thematic: when relations dont^ have resemblance physically but are related by some scene. eg watermelon and a knife.

Taxonomial: when relations have some physical resembleance. eg ~~so~~ pen and a pencil, they look similar but are actually different.

4) Problem formulation consists of need - objective - constraint - criteria - needed information - safety ..

For a sand paper :

(a) **NEED**

- used in lab experiments
- to prep up paint canvases
- to remove old paint, wood finishing
- to remove rust.
- To make surface rougher.

(b) **Constraints**

Grit range - 150-200.

Price less than ₹25

(c) **Criteria**

- size according to the need. (painting, handy-work, labs)
- Effectively removes paint
- Smooth side for easy holding.

(d) **Needed information**

- type of job
- Does it need motor attachments or would work with hand
- Dimensions

(e) Problem at hand.

- to remove old paint / varnish / polish
- dull the lenses or other use in laboratory
- sanding up the canvas so that paint ~~adhere~~ adhres properly

6.

(b) Safety

- Rough sides may irritate hands so use gloves or should have smooth edges
- Use a dust mask to protect from dust

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5 Articulating design ideas

- Anyone can think of a design or design it to some extend but it is very difficult to explain your vision to other as others might not think from your perspective

- This form of explanation can be anything, verbal, pictorial or by proofs. The idea should be as clear to the person in front of you as it is in your head. Explain to them like a kid. If your idea is clear and simplified, all the stakeholders will help..

- You also have to keep in mind that your explanation shouldn't be goal centric as the goal can change any day. Maybe the primary goal remains the same but the bigger picture might change in future.

- For example, you created a smart land mower. To present it, the best form of communication before the actual prototype phase is a pictorial representation, like how the body would look like, what the mechanism would be and what the end goal, to clean the backyard and trim the grasses. Now keep in mind that you shouldn't focus on grasses. Maybe after designing you add a specification to water the lawn too. Main focus should be smart gardening.

Now to use storytelling to convey my idea of a smart land mower, I can have a character, named 'Kisan'. He is a gardener. He explains his idea by saying that Kisan has to become the best gardener in the world.* He has been gardening since he was a teenager and had seen his parents suffer, as they were gardeners too. With the help of a smart mower he can make his job easy. He could go to multiple houses and complete their jobs faster. He would ~~also~~ not only mow the lawn but he would pick the garbage as well. ~~Not~~ That's not all, he would water the plants too. ~~s~~ This will make him earn threefolds while completing ~~just one chore~~ three tasks in one go. Kisan would then become more financially independent, so this gives Kisan a happy ending.

*without that much labour.

— → x ——————— x ————————— x —