UNIT - II

Design Thinking Process

Design thinking process (empathize, analyze, idea & prototype), implementing the process in driving inventions, design thinking in social innovations. Tools of design thinking - person, costumer, journey map, brainstorming, product development

Design thinking is a methodology which provides a solution-based approach to solving problems. It's extremely useful when used to tackle complex problems that are ill-defined or unknown—because it serves to understand the human needs involved, reframe the problem in human-centric ways, create numerous ideas in brainstorming sessions and adopt a hands-on approach to prototyping and testing.

Human Centered Design and its Process

Human-centered is a philosophy that empowers an individual or team to designing products, services, systems and experiences that address the needs and insights of the user who experience the problems

- Human-centered design is a creative approach to solve problems
- It has been championed by Nobel Prize Laureate Herbert Simon, Developed by Stanford university Design school
- Human-centered design is distinguishing other problem solving approaches by its intensive focus on understanding the perspective of the person who experiences a problem and needs.
- The solution that has been designed for the end users is truly meeting their needs effectively.
- The end users are constant part of design process and become part of the design team itself in this human centered design.

Examples of Human-centered design

1. **Kids Toothbrush:**
   Kids hold tooth brushes is totally different from an adult. so it is harder forthem to use a toothbrush that are designer for adults.

Tooth brush for adult

Problem	Solution designed
➢ Kids hands are so small ➢ They hold tooth brush inside their fist. Adults hold it insidethe fingers ➢ Lack of motivation to brush theirteeth 	➢ Made the hands of brush fat and squishy ➢ Introduced small bristles ➢ Introduced funny character tothe handle ➢ Created funny accessories  Designed by IDEO for Oral-B

2. Portable Music player –I pod Shuffle

- Portable music players are introduced in 1997 from that timemanufacturers tried to include more and more functionalities of music players. This result in abandoning the user experience of these devices.
- Too much of functionalities and complicated design. The control buttons are too close and accessibility was an issue. Most people use portable music player when they are outside (jogging ,gym, gardening etc) .and it was difficult to hold it during activities

Problem	Solution designed
➢ Inaccessible buttons ➢ Too much features and increased complexity ➢ Difficulty in carrying it 	➢ Simple and accessible buttons ➢ Comes with a clip ➢ Reduced complexity with sleek design  Designed by Apple Inc

3. **Ketchup bottle:**

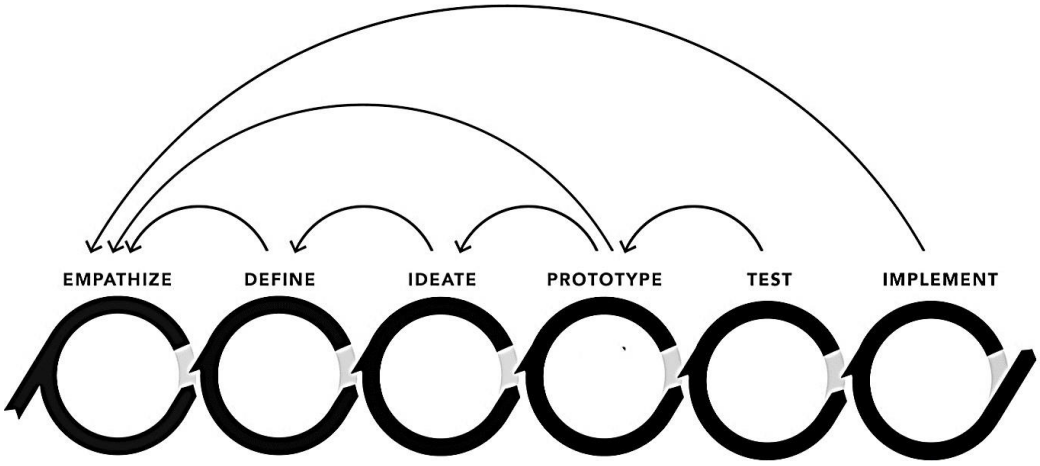
- Getting full ketchup out of a ketchup bottle was a pain task. The ketchupwas thick and it takes more time to squeeze out till the last drop from that bottle and that's why HEINZ introduced an inverted bottle design.
- HEINZ purchased the inverted bottle design from an American designer named Paul Brown. They redesigned the bottle to have a handgrip and holding space because of its inverted design , the user will get the last drop from the bottle

Problem	Solution designed
➢ Difficulty in getting full ketchup out of the bottle ➢ Difficulty in handling andsqueezing the bottle with one hand 	➢ Designed inverted standing bottle ➢ Designed bottle for easy handling with one hand  Designed by Paul Brown for HEINZ

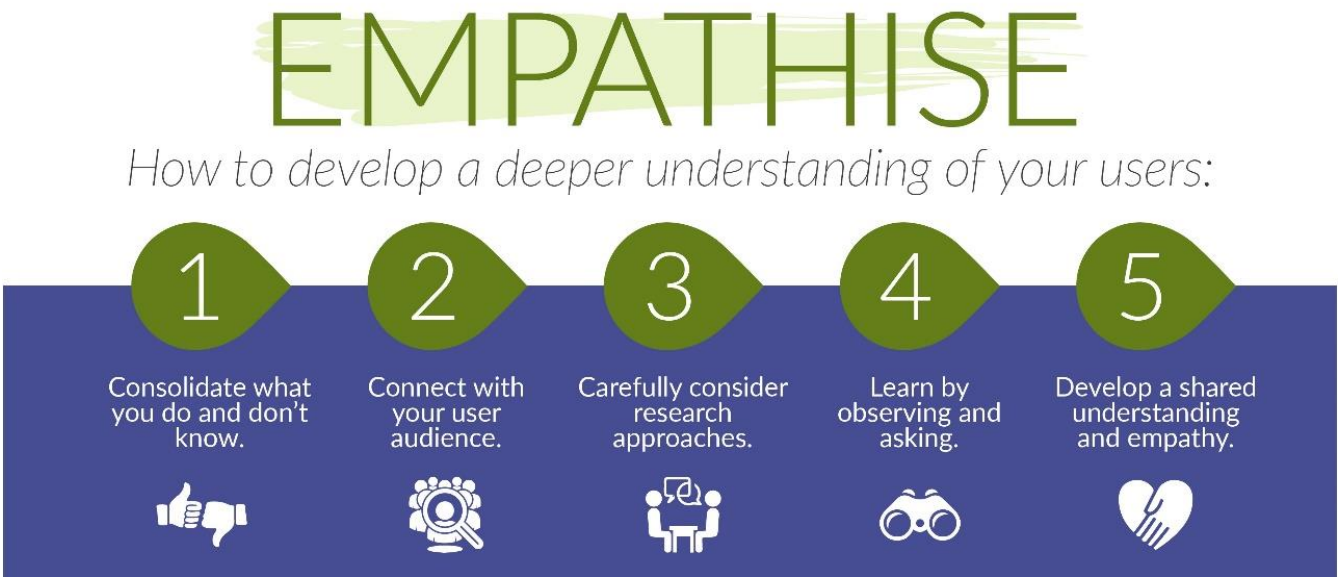
Human-centered design process has many forms, the model developed by Stanford design school has 5 Key phases.

The phases are

1. Empathize
2. Define
3. Ideate
4. Prototype
5. Test



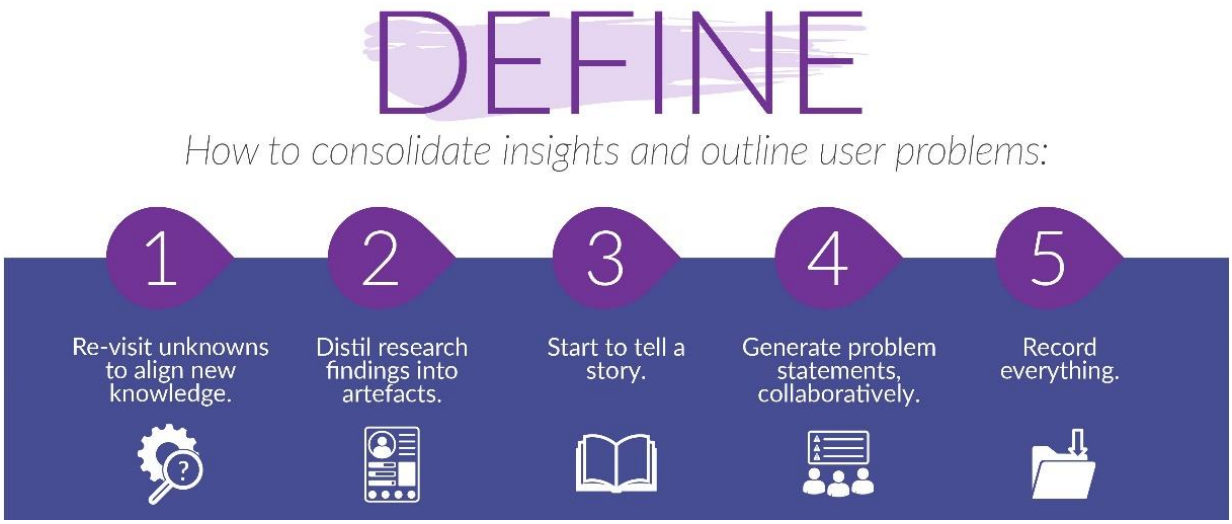
Stage 1: Empathize—Research Users' Needs



- One of the main objectives of empathize stage is to identify user needs and behaviors that are latent, or unarticulated.
- As a designer, it's important to distinguish between what people say they would do in a certain situation, and what they actually do
- In reality, users may have habits or desires that they're not aware of, so it's essential for the designer to observe the user in action
- Empathic research and design is not concerned with facts about the user, such as their age or location. Rather, it focuses on their feelings towards a product and their motivations in certain situations.
- Why do they behave in a certain way? Why do they prefer to do this instead of that? Why do they click here rather than there when presented with a particular screen or page?

Stage 2: Define—State Your Users' Needs and Problems

- User need statements also often called problem statements or point of view statements, are the primary tool in the second stage of design thinking - define stage. They align different points of view before moving forward into ideating.



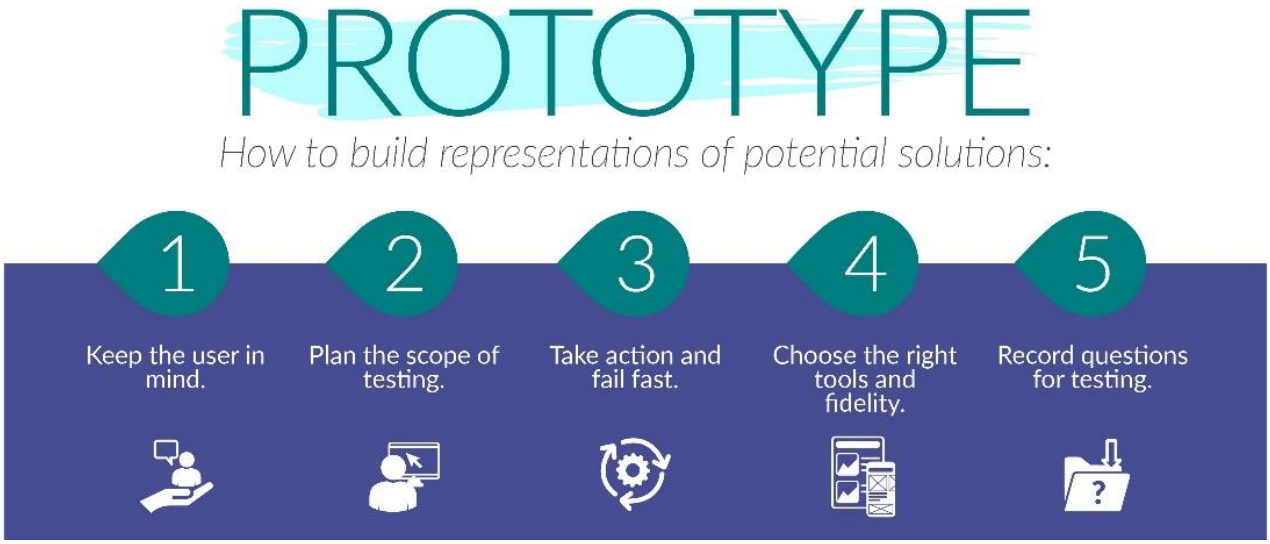
- During Define phase empathy helps to define the problem statement. This stage based on what have learned about customer and context.
- During this phase, designer is wanting to organize their research using a different lens, maps or frameworks.
- Empathy Map — organize by consumer thinking/feeling, what they are experiencing and pains
- Customer Journey — organize along with how the consumer shops or interacts with the product
- Point of View — focusses on customers' insights about users and their needs.

Stage 3: Ideate—Challenge Assumptions and Create Ideas

- In ideate phase the designer will start generating some rational concerts that seek to solve the problem by using the problem statement.

- Typically, these ideas are rough- those that it results from the brainstorming. The important thing hear is to " think outside the box" generate and generate multiple ideas so that in the next stage draw some options for prototyping.
- The objective of the Idea generation phase is to find creative ideas that will solve the targets and challenges of users. This is the phase in which the design team's creativity and imagination should be at the top level.
- To be a good idea, it needs to be focused on the people, are how the idea fits the needs, problems, and their goals. That is why it is important to understand how the ideas gives values and the usefulness to the beautiful or feasible solution.
- Ideating allows a design team to consider creative ways to address the needs of the user have highlights in the **Empathize Stage** and more clearly outlines in the **Define Stage.**
- In this process, design thinkers also resort to use of boards, sticky notes, sketching, chart papers, mind maps etc.

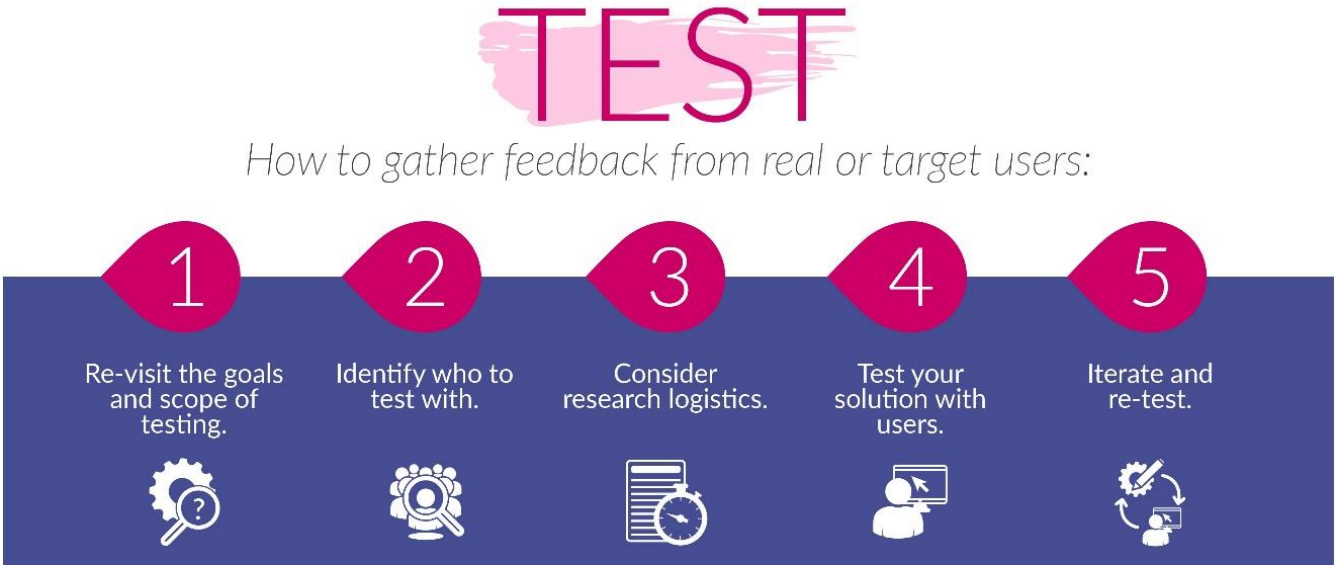
Stage 4: Prototype—Start to Create Solutions



- A prototype is a draft version of a product that allows designers to explore ideas and show the intention behind a feature or the overall design concept to users before investing time and money into development.
- The Goal of a prototype is the test products and services then its ideas before spending lots of time and money into creating the final version of the sellable product.
- In prototyping stage three things are mainly taken care of
  1. Creation of experience
  2. Getting Feedback
  3. iteration
- The step of prototyping is the one in which the end user comes into picture. The end user is actively involved in this component of design thinking.
- All the feedback is taken from the customer, and based on the criticisms, suggestions, and appreciations received, the design thinkers create a better solution after iterating the process of design thinking's first three steps, viz. Empathize, Define, and Ideate.

Stage 5: Test- Try for Solutions

- The testing phase allows the designers to gain the feedback and insights that may not be possible without testing their prototypes.
- Through these tests, designers will be able to identify aspects of their prototype that did not work well, or the end user did not find the functional or pleasing.



- In the testing phase, Design thinking teams tests prototyped solution with users representing the target personas.
- Update the solution in an iterative manner until the solution in an iterative manner satisfies the user needs and overcomes the challenges that is defined in the initial phase of the project.

Implementing the process in driving inventions

Implementing a process to drive innovation involves creating a structured framework that encourages the generation, development, and implementation of creative ideas. Here's a step-by-step guide to implementing an innovation process within an organization:

Establish a Culture of Innovation:

Foster an environment that values creativity, experimentation, and risk-taking. Encourage open communication, diverse perspectives, and a willingness to challenge the status quo.

Define Clear Objectives and Goals:

Determine the specific areas or aspects of the organization where innovation is most needed. Clearly articulate the goals and outcomes you hope to achieve through the innovation process.

Identify Innovation Champions:

Appoint individuals or teams responsible for driving the innovation process. These champions should be passionate about innovation and have the skills to facilitate creative thinking.

Understand Customer Needs and Market Trends:

Conduct market research and engage with customers to understand their pain points, preferences, and emerging trends. This insight will guide the direction of your innovation efforts.

Idea Generation:

Encourage employees at all levels to contribute ideas. Provide platforms for brainstorming sessions, idea contests, suggestion boxes, and collaborative workshops. Emphasize diversity of thought.

Idea Evaluation and Prioritization:

Establish criteria for evaluating and prioritizing ideas. Consider factors such as feasibility, market potential, alignment with organizational goals, and resource requirements.

Prototype and Testing:

Develop prototypes or proofs of concept for selected ideas. This allows for practical testing and refinement before full-scale implementation.

Allocate Resources:

Provide the necessary resources, including funding, time, and expertise, to support the development and implementation of innovative ideas.

Create Cross-Functional Teams:

Form multidisciplinary teams that bring together individuals with diverse skills and expertise. This promotes a holistic approach to problem-solving and innovation.

Encourage Collaboration and Knowledge Sharing:

Foster a collaborative work environment where employees freely exchange ideas and insights. Use platforms like intranets, team meetings, and collaboration tools to facilitate communication.

Pilot Projects:

Test innovations on a small scale before full-scale implementation. This allows for adjustments based on real-world feedback and minimizes potential risks.

Measure and Evaluate Progress:

Establish key performance indicators (KPIs) to track the impact of innovations. Monitor progress towards achieving the defined objectives and make adjustments as needed.

Celebrate Success and Learn from Failures:

Recognize and celebrate successful innovations to reinforce a culture of creativity. Additionally, view failures as learning opportunities and use them to refine future innovation efforts.

Feedback and Iteration:

Solicit feedback from stakeholders, including employees, customers, and partners. Use this feedback to refine and improve the innovation process for ongoing success.

Institutionalize Innovation:

Integrate innovation into the organization's core values, strategic plans, and day-to-day operations. Ensure that it becomes a natural part of how the organization operates.

Design Thinking for Social Innovations

Design thinking can be a transformative approach in social innovation by focusing on human-centered solutions. Here's how it can be applied, along with some real-world examples:

Empathy and Understanding: Engage deeply with the community to understand their needs, challenges, and aspirations. This involves interviews, observations, and immersing oneself in their environment.

Example: In Vietnam, the Positive Deviance Initiative used design thinking to address child malnutrition. By identifying and learning from families who were able to maintain good nutrition despite having the same resources as others, they developed community-driven solutions1.

Defining the Problem: Clearly articulate the problem based on the insights gathered. This helps in narrowing down the focus to the most pressing issues.

Example: The Naandi Foundation in India identified that the design of water containers was a barrier for women to access clean water. They redefined the problem to focus on the usability of the containers.

Ideation: Brainstorm a wide range of ideas without judgment. Encourage creativity and think outside the box to explore various solutions.

Example: IDEO.org worked with low-income communities to generate ideas for improving financial literacy. They held workshops to brainstorm and prototype different educational tools and methods3.

Prototyping: Develop small-scale models or prototypes of the potential solutions. This allows for experimentation and refinement of ideas.

Example: In Kenya, the design firm IDEO.org created prototypes of solar lighting solutions for off-grid communities. These prototypes were tested and refined based on user feedback3.

Testing and Feedback: Test the prototypes with the community to gather feedback. This step is crucial for understanding what works and what needs improvement.

Example: The Aravind Eye Care System in India used design thinking to develop and test low-cost eye care solutions. They continuously gathered feedback from patients to improve their services2.

Iterative Improvement: Continuously refine and improve the solutions based on feedback and changing needs. This iterative process ensures that the solutions remain relevant and effective.

Example: The d.light company iteratively improved their solar lanterns based on user feedback from rural communities, ensuring the products met the needs of their users3.

By following these steps, design thinking helps create innovative, user-centered solutions that can effectively address social challenges.

Tools of Design Thinking

- Designing and developing a product or service often involves a large team of people with different background and experiences who must be on same platform regarding the project (user's needs, behaviors, and objectives) and even the processes involved.
- This common understanding is often built with visualizations (commonly referred to as Mappings).
- Mappings Make sense of and describe various aspects and processes associated with a product or services.

There are three types of Mapping

1. Empathy(Person) Mapping
2. Customer Journey Mapping
3. Brainstorming

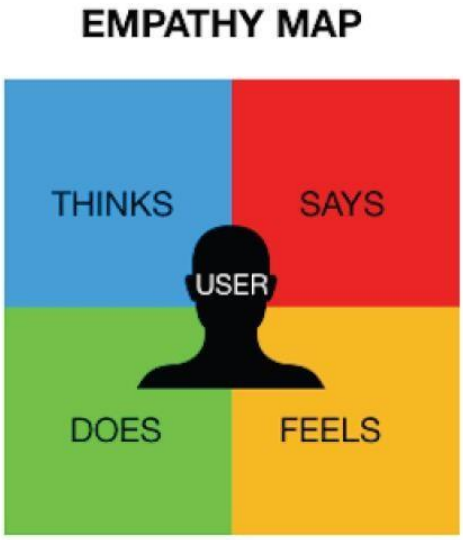
Empathy(Person) Mapping

An Empathy Map is a collaborative Visualization used to articulate what is known about a particular user. It externalizes user knowledge in order to 1. Create a shared understanding and 2. Aid in decision making.

Empathy maps widely used is a powerful, fundamental tool for design communities.

Format:

- Traditional empathy maps are spilt into four quadrants.
- The four quadrants are say, Thinks, Does and Feels with the user or persona in the middle.
- Empathy Maps provide a glance into who a user is as a whole and are not chronological or sequential



Empathy Mapping Quadrants:

These are the four Quadrants that leads to greater understanding of design team's intended to.

Thinks:

- This is what an end user is thinking when using product or going through process.
- The *Thinks* quadrant captures what the user is thinking throughout the experience.
- ***Example:*** They hate packaging that requires scissors or a knife to open

Says:

- This is what a consumer says in an interview, research study or focus group about products or processes.
- The *Says* quadrant contains what the user says out loud in an interview or some other usability study.
- ***Example:*** This packaging is really hard to open by hand

Does:

- This is the action a user can takes physically in response to product or processes. What behaviors or actions did you notice?
- From the research, what does the user physically do? How does the user go about doing it?
- ***Example:*** User turns the packaging over and over, looking for an easy entry point

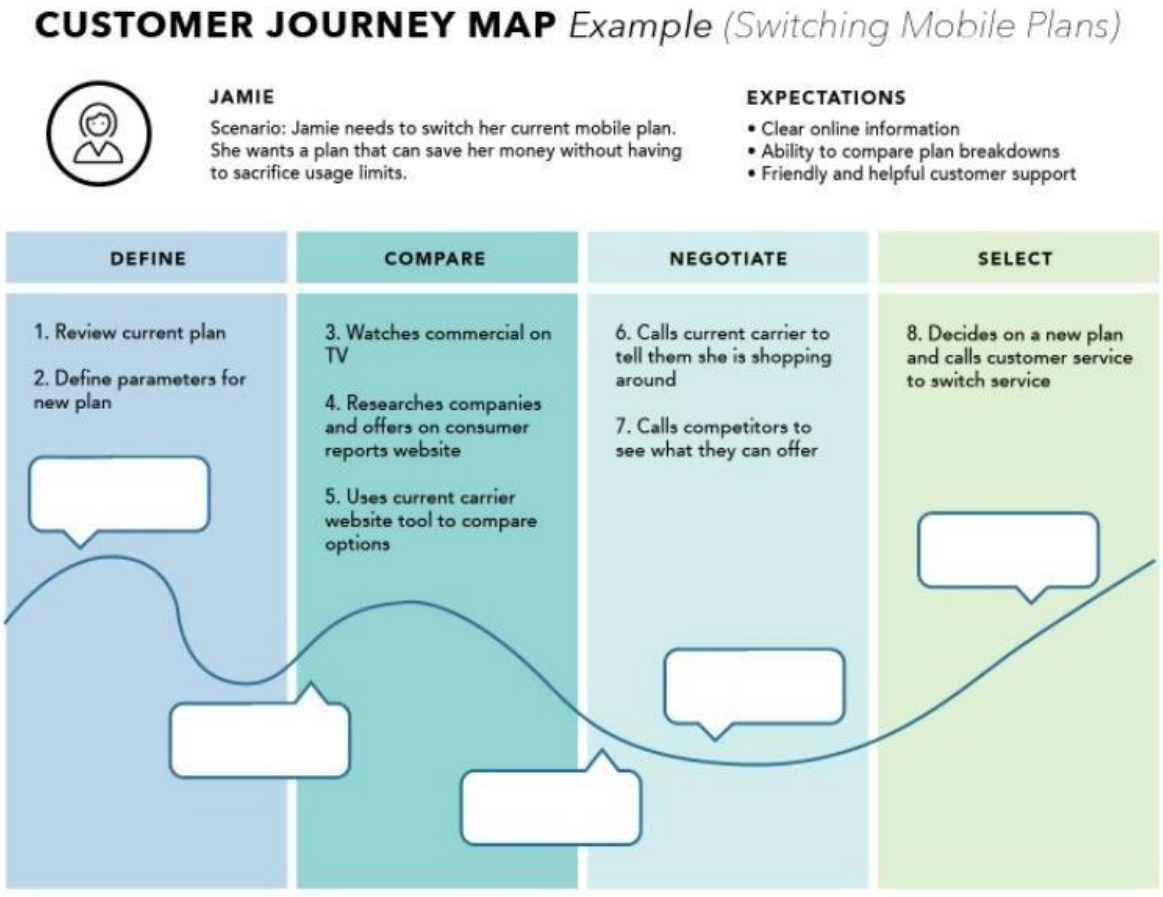
Feels:

- This includes the emotions a consumer is having while dealing with your product or processes.
- Observe a consumer's body language and facial expressions to gauge feelings.
- The Feels quadrant is the user's emotional state, often represented as an adjective plus a short sentence for context.
- ***Example:*** The user is frustrated and annoyed that they can't get through the packaging easily

Customer Journey Mapping

A customer or user journey map is detailed record of how a customer experience a specific task, product, or service.

- It is used for understanding and addressing customer needs and pain points
- Journey mapping starts by compiling a series of user goals and actions into a timeline skeleton.
- A customer journey map can help to build empathy towards the users as designers try to experience what they go through
- Journey Mapping Combines two powerful instruments: storytelling and Visualization.
- Storytelling and visualization are essential facets of journey mapping because they are effective mechanisms for conveying information in a way that is memorable, concise and that creates a shared vision.
- The map is tied to a specific product or service.
- It is split into 4 swim lanes: Phases, actions, thoughts, mindsets/emotion



Brainstorming

Brainstorming is, so to speak, the mother of all creativity techniques (linguistically from:" using the brain to storm the problem). Ideas about a question a solution to a problem should be Express spontaneously in a group.

- It is a group activity technique.
- It is designed to generate lots of ideas for solution of a problem.
- It is a commonly used tool by academicians, researchers, and business teams.
- The Value of brainstorming is not the ideas generated; it is the shared value/evaluation context created. The experience of brainstorming creates a group of people with a shared perspective, and an understand of each other's communication styles, who are then capable of providing a useful and powerful critique of future work on the topic.

Brainstorming Techniques:

1. **Freewrıtıng:**
   - Write down whatever comes into mind.
   - Do not judge the quality of writing.
   - Do not worry about style, spelling, grammar, or punctuation.
   - When you have finished your writing and have reached your goal, read back over the text, decide the solution.
2. **Nomınal Group Technıque:**
   - Participants are asked to write their ideas anonymously. Then the moderator collects the ideas and each is voted on by the group.
   - The best idea is chosen
3. **Group Passıng Technıque:**
   - Each person in a circular group writes down one idea,and then passes the piece of paper to the next person in a clockwise direction,who adds some thoughts.
   - This continues until everybody gets his or her original piece of paper back.By this time,participants will have examined each idea in detail
4. **Individual Braınstormıng:**
   - It typically includes such techniques as free writing, free speaking, word association,and drawing a mind map . Individual brainstorming is useful method in creative wiriting
5. **Question Braınstormıng:**
   - This process involves brainstorming the questions,rather than trying to come up with immediate answers and short term solutions
   - Six Key Questions
     - Who?
     - What?
     - When?
     - Where?
     - How?
     - Why?

Product Development

- Product development is the process of creating a new product or service. It typically involves a number of processes and steps, from conception, ideation, design, to development, validation, production, and launch.
- By utilizing the design thinking framework, companies can improve their product development process and create more successful products for their customers.
- Product development is the process of taking an idea and turning it into a marketable product. It involves refining the idea, defining the product specifications, and then creating and testing prototypes.
- The product development process also includes market research and analysis, to ensure that the product meets the needs of the target audience.
- Design thinking is a creative process used to solve problems and innovate solutions. It involves creating a shared understanding of the problem and then brainstorming and prototyping possible solutions.
- Product development is the process of taking an idea, refining it, and turning it into a product that can be sold. The two processes, design thinking and product development, work together to ensure the success of a product.