Module 2
Design Thinking Approach

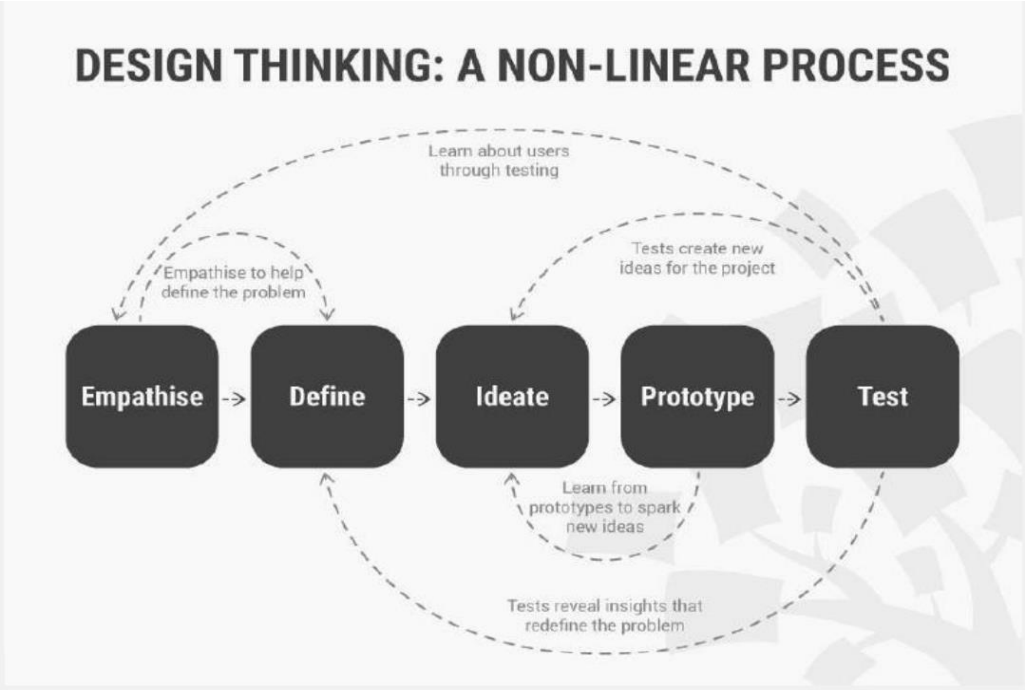
Introduction to Design Thinking, Iterative Design Thinking Process Stages: Empathize, Define, Ideate, Prototype and Test. Design Thinking as Divergent-Convergent Questioning. Design Thinking in a Team Environment.

Introduction to Design Thinking

- Design Thinking is a design methodology that provides a solution-based approach to solving problems.
- Design thinking is a non-linear, iterative process that teams use to understand users, challenge assumptions, redefine problems and create innovative solutions to prototype and test.

Iterative Design Thinking Process

- Consist of five phases-Empathize, Define, Ideate, Prototype and Test.
- It is most useful to solve problems that are ill-defined (unclear) or unknown.



1. **Empathize**
    - Designer should gain an empathetic understanding of the problem that they are trying to solve, typically through user research.
    - Empathy is crucial to a human-centered design process such as design thinking because it allows you to set aside your own assumptions about the world and gain real insight into users and their needs. Place yourself as an end user and identify the user expectations and needs.
    - Depending on time constraints, a substantial amount of information is gathered at this stage to use during the next stage and to develop the best possible understanding of the users, their needs, and the problems that underlie the development of that particular product.

2. **Define**
    - It's time to accumulate the information gathered during the Empathize stage.
    - You then analyze your observations and synthesize them to define the core problems you and your team have identified. These definitions are called problem statements.
        - ✓ Problem statements are concise description of design problems.
        - ✓ Design team use them to define the current and ideal states to freely find user centered solutions.
        - The problem definition should be clear and unambiguous.
        - Define your point of view – meaningful and actionable problem statement.

3. **Ideate**
    - The solid background of knowledge from the first two phases means you can start to think outside the box", look for alternative ways to view the problem and identify innovative solutions to the problem statement you've created.

- Ideate= transition from identifying problems to exploring solutions.
- Ideation is leveraged to:
    - Harness the collective perspectives and strengths of your team.
    - Step beyond obvious solutions and drive innovation.
    - Uncover unexpected areas of exploration.
    - Create fluency (volume) and flexibility (variety)in your innovation options.
- Brainstorming is particularly useful here.
- Brainstorming is a method design teams use to generate ideas to solve clearly defined design problems.
- Brainwrite is another way of expressing ideas.
    - The participants write down their ideas on paper.
    - They pass on their own piece of paper to another participant.
    - The other participant elaborates on the first person's ideas and so forth.
    - Another few minutes later, the individual participants will again pass their papers on to someone else and so the process continues.
    - The process takes 15 minutes.
    - Ideas are discussed afterwards.

4. Prototype

- This is an experimental phase.
- This could involve simply paper prototyping, simulations, 3D models, animations etc.
- The aim is to identify the best possible solution for each problem found.
- Prototypes maybe shared and tested within the team and a small group of people outside the design team.
- The solutions are investigated and either accepted, improved and reexamined, or rejected.
- By the end of this stage, the design team will have a better idea of the constraints inherent to the product.

5. **Test**
    - Evaluators rigorously test the prototypes.
    - Although this is the final phase, design thinking is iterative: Teams often use the results to redefine one or more further problems.
    - So, they can return to previous stages to make further iterations, alterations and refinements to identify the best alternative solution.
    - During this phase, alterations and refinements are done.

DESIGN THINKING ITERATIVE APPROACH CASE STUDY - BAG FOR COLLEGE STUDENTS

Illustrate the design thinking approach for designing a bag for college students within a limited budget. Describe each stage of the process and the iterative procedure involved. Use hand sketches to support your arguments.

Objective: To design a bag for college students in limited budget.

1. Empathize
[1] It should have a facility to carry books, tiffin and other small articles.
[2] It should be closed.

2. Define
[1] It should have separate racks for keeping books and tiffin
[2] It should have zips to lock. [3] It should be light weight with sleek design.

3. Ideate
[1] It should have separate racks for keeping books and tiffin
[2] It should have zips to lock.
[3] It should be light weight with sleek design.
[4] It should have a compartment to keep the laptop.
[5] It should have a compartment on the outer side to keep water bottles.
[6] It should have a small pouch on the outside to keep necessary things like pen, keys, chargers etc.
[7] The shoulder strap should be of soft material.
[8] It should be waterproof so that it can be used in rainy season too.
[9] It should have an inner secret pouch to keep money or any other important thing.

4. Prototype : The 2D prototype is shown

6. **Test**
   Ensure that all the expected functionalities are incorporated in the product. The above prototype has separate racks for keeping books and laptop. It has a water bottle holder. The shoulder strap is made of soft sponge material. The material used is waterproof polyester. It is light weight and has sleek design.

DESIGN THINKING AS DIVERGENT-CONVERGENT QUESTIONING

Design thinking is an iterative approach and we follows two generic patterns of design thinking: Divergent thinking and Convergent thinking.

Divergent thinking is the process of thinking that explores multiple possible solutions in order to generate creative ideas. i.e. Think for all possible ways to reach a solution.

Convergent Thinking is the process of figuring out a concrete solution to any problem. i.e. Thinks for a finaI solution.

Convergent Thinking	Divergent Thinking
Convergent Thinking is the process of figuring out a concrete solution to any problem.	**Divergent thinking** is the process of thinking that explores multiple possible solutions in order to generate creative ideas.
It's a straight forward process that focuses on figuring out the most effective answer to a problem.	In contrast, divergent thinking refers to opening the mind in various directions and trying out multiple solutions for a problem.
Its characteristics include •Speed •Accuracy •Logic	Its characteristics include •Spontaneous •Free-flowing •Non-linear
Convergent thinking helps to find out the best possible answer to any problem, which are accurate most of the time, and no room for ambiguity is left.	Although Divergent thinking keeps the options open, a completely accurate answer isn't identified.

CONVERGENT -DIVE REGENT THINKING - CASE STUDY OF BULB

DIVERGENT THINKING -CASE STUDY OF PEN

List out some uses of pen other than writing

- ✓ as a straw
- ✓ as a toy "telescope" for kids
- ✓ To rewind cassette tape
- ✓ as an improvised stabbing weapon

- ✓ As a paper punch
- ✓ Use as a ruler
- ✓ To make a smart phone stylus
- ✓ To make a whistle

DIVERGENT THINKING -CASE STUDY OF FORK

List out some uses of fork other than eating aid

- ✓ Scramble things
- ✓ Mix things
- ✓ Stir stuff
- ✓ Poke things or people
- ✓ Give it to a small farmer as a pitch fork
- ✓ Scratcher
- ✓ Get something out of a fire
- ✓ Murder weapon
- ✓ Tool of torture
- ✓ Prop something open

DESIGN THINKING AS A TEAM

In order to get best and creative solutions, design thinking process is generally performed as a team activity.
Every member may raise their own ideas and solutions.
The team will analyze the pros and cons of each solution or design and then finalize the best suitable solution.
But during design thinking as a team activity, conflicts between team members may arise. So It is very important to resolve these conflicts.

CHARACTERISTICS OF AN EFFECTIVE TEAM

Team goals are as important as individual goals.
The team understands the goals and is committed to achieving them.
Trust replaces fear, and people feel comfortable taking risks.
Respect, collaboration, and open-mindedness are prevalent.

Team members communicate readily; diversity of opinions is encouraged.
Decisions are made by consensus and have the acceptance and support of the members of the team.

STEPS IN RESOLVING CONFLICTS

1. Prepare the resolution
2. Understand the situation
3. Reach agreement

Step 1: Prepare for resolution

- **Acknowledge the conflict** -The conflict has to be acknowledged before it can be managed and resolved. The tendency is for people to ignore the first signs of conflict, perhaps as it seems trivial, or is difficult to differentiate from the normal, healthy debate that teams can thrive on. If you are concerned about the conflict in your team, discuss it with other members. Once the team recognizes the issue, it can start the process of resolution.
- **Discuss the impact** -As a team, discuss the impact the conflict is having on team dynamics and performance.
- **Agree to a cooperative process** -Everyone involved must agree to cooperate in to resolve the conflict. This means putting the team first, and may involve setting aside your opinion or ideas for the time being. If someone wants to win more than he or she wants to resolve the conflict, you may find yourself at a stalemate.
- **Agree to communicate** - The most important thing throughout the resolution process is for everyone to keep communications open.

Step 2: Understand the situation

- **Clarify positions** - Whatever the conflict or disagreement, it's important to clarify people's positions. Whether there are obvious factions within the team who support a particular option, approach or idea, or each team member holds their own unique view, each position needs to be clearly identified and articulated by those involved.
- **List facts, assumptions and beliefs underlying each position** -What does each group or person believe? What do they value? What information are they using as a basis for these beliefs? What decision-making criteria and processes have they employed?
- **Analyze in smaller groups** - Break the team into smaller groups, separating

people who are in alliance. In these smaller groups, analyze and dissect each position, and the associated facts, assumptions and beliefs.

- **Convene back as a team** - After the group dialogue, each side is likely to be much closer to reaching agreement. The process of uncovering facts and assumptions allows people to step away from their emotional attachments and see the issue more objectively. When you separate alliances, the fire of conflict can burn out quickly, and it is much easier to see the issue and facts laid bare.

Step 3: Reach agreement

Now that all parties understand the others' positions, the team must decide what decision or course of action to take. With the facts and assumptions considered, it's easier to see the best of action and reach agreement.

PREVENTING CONFLICTS

Dealing with conflict immediately -avoid the temptation to ignore it.
Being open -if people have issues, they need to be expressed immediately.
Practicing clear communication -articulate thoughts and ideas clearly.
Practicing active listening -paraphrasing, clarifying, questioning.
Practicing identifying assumptions-asking yourself "why" on a regular basis.
Not letting conflict get personal -stick to facts and issues, not personalities.
Focusing on actionable solutions -don't belabor what can't be changed.
Encouraging different points of view -insist on honest dialogue and expressing feelings.
Not looking for blame -encourage ownership of the problem and solution.
Demonstrating respect-if the situation escalates, take a break and wait for emotions to subside.