

Gujarat Technological University's

Centre for Industrial Design (OPEN DESIGN SCHOOL)

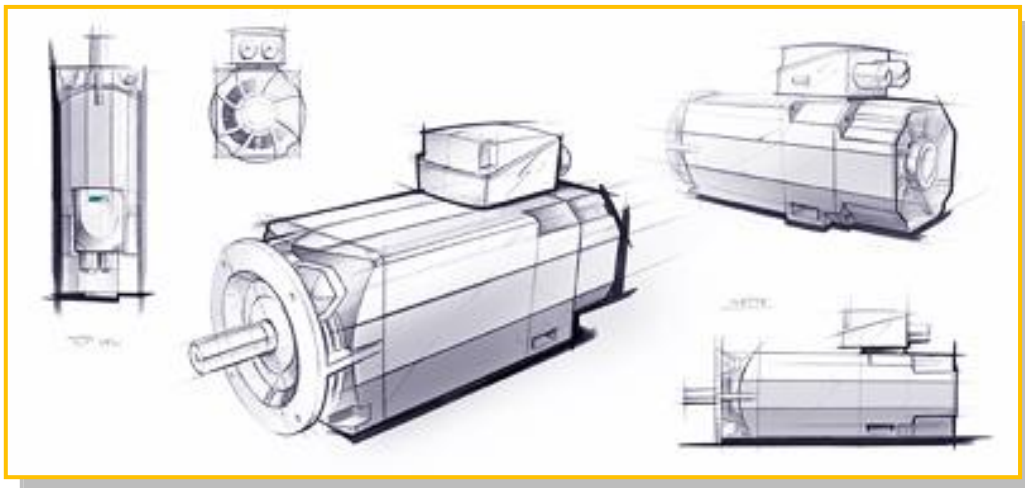
REPORT-

Faculty Development Program (33rd FDP)

9-12 February 2016

DESIGN ENGINEERING

(Journey started From February 2012and it's continue.....)



Date: 9, 10, 11, 12 February 2016 (4 Day)

Time: 10:00 am to 5:00 pm

Venue: Room no. 131, 2nd Floor, ACPC building,

GTU Innovation Council,

L.D. Engineering College, Ahmedabad.

For any query, kindly contact: design@gtu.edu.in

Development of Design Based Learning:

On 2nd February 2012 (The first cohort of 4-year degree engineering students graduated out in May 2012), GTU started the process of updating its syllabi. It was decided to develop a design-based learning system. GTU has introduced courses of Design Spine in academic year 2014-15 from 3rd semester namely **“Design Engineering”**. Design Engineering is very unique and pioneering initiation in Engineering Education by GTU which is based on globally accepted and implemented **“Design Thinking”** methodology by designers and engineers. **GTU’s Centre for Industrial Design – OPEN DESIGN SCHOOL** has taken up the huge and remarkable challenge to leverage and implement this course in all affiliated engineering colleges of GTU. *Centre for Industrial Design – OPEN DESIGN SCHOOL* has successfully completed 1.5 years of this course in which 32 Faculty Development Program (FDP) have been organized for 3rd, 4th and 5th semester with training of more than 2000 faculty members from around 120 Engineering colleges across the states from more than 15 branches.

Now, in this semester also, the Centre will be organizing more FDPs for Faculty Members for Design Thinking as the goal is to train all nearly about 17,000 faculty members of GTU affiliating colleges. On 9th to 12th February 2016, the Centre **organized 33rd FDP with new hands-on exercises, presentations, examples** and techniques of Design Thinking. In this FDP, 69 faculty members participated actively. But this time, we observed that 27 faculty members had come for their second FDP. Hence we did **pilot run with advance level workshop** with all those 27 faculty members with new tools and techniques for higher level learning. We completed this 33rd FDP in two different mode; (1) Working Level & (2) Advanced Level. This report will cover both the working and the advanced level workshop details.

At the Advanced level, the participants applied their learning while preparing case studies and learned more tools for the different phases of Design Thinking.

Workshop Program

Day 1:

Session 1 - **Welcome & Orientation session** – Introduction to Design Engineering Course

Session 2 – **Introduction** – What is Design Thinking? Its importance, socio-economic relevance

Session 3 – **Learning Tools to better Learn Design Thinking** – Bio Mimicry, Analogy, Gestalt Model and Heuristic Approach – All with examples

Session 4 – **Hands on Exercises** – Team Building and Log book

Day 2:

Session 5 - **Empathy** – Observation techniques & Field work

Session 6 – **Field Visit** – To gather observation data

Session 7 – **Summarization of Data** - Analysis of Data gathered during Observations

Session 8 – **Empathy Mapping** – Canvas Preparation

Day 3:

Session 9 – **Ideation** – Brainstorming techniques to Innovation

Session 10 – **Ideation Canvas** – Canvas Preparation

Session 11 – **Product Development** – Form, Function, Features

Session 12 – **Product Development Canvas** – Canvas Preparation

Day 4:

Session 13 – **Reverse Engineering** – Selection of Branch Specific artefact/component/product

Session 14 – **Disassembly & Identify Technical aspects**

Session 15 – **Contents of 5th Semester**

Session 16 – **Contents of 6th Semester**

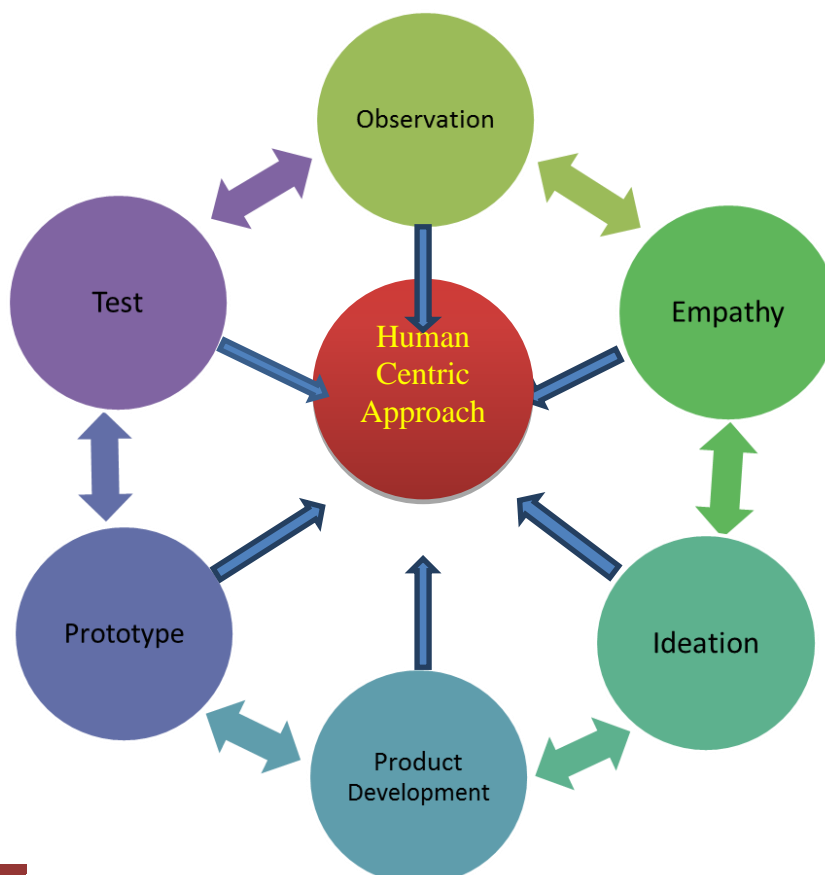
In the advanced workshop were included additional tools and techniques, related to Design Thinking for higher level learning. Please scroll to the end of this report for details of the advanced level FDP.

Day 1:

On the very first day, after registration, The FDP has started by Design team and given the information of Design Engineering syllabus in orientation session by the mentor, Mr. Jaimin Dave, Assistant Professor (Centre for Industrial Design – OPEN DESIGN SCHOOL). He explained the flow of Design Engineering from 3rd semester to 6th semester.

After the orientation session, the introduction of Design Thinking Methodology, with main objective of the University to introduce the Design Engineering subject, was presented by Mentor, Mr. Karmjitsinh Bihola, Assistant Professor (Centre for Industrial Design – OPEN DESIGN SCHOOL). One of the key objectives of this initiation is to infuse the Design Thinking mind-set into engineers of future with importing the methodology into the core subjects also. Design Thinking approach was introduced with different examples and visuals. He explained how so many innovations have been carried out in the world by following the Design Thinking process. **Design Thinking is Human Centered process with lots of iterative cycles to reach the final solution for satisfying User's Unmet Needs.**

Design Thinking Methodology:



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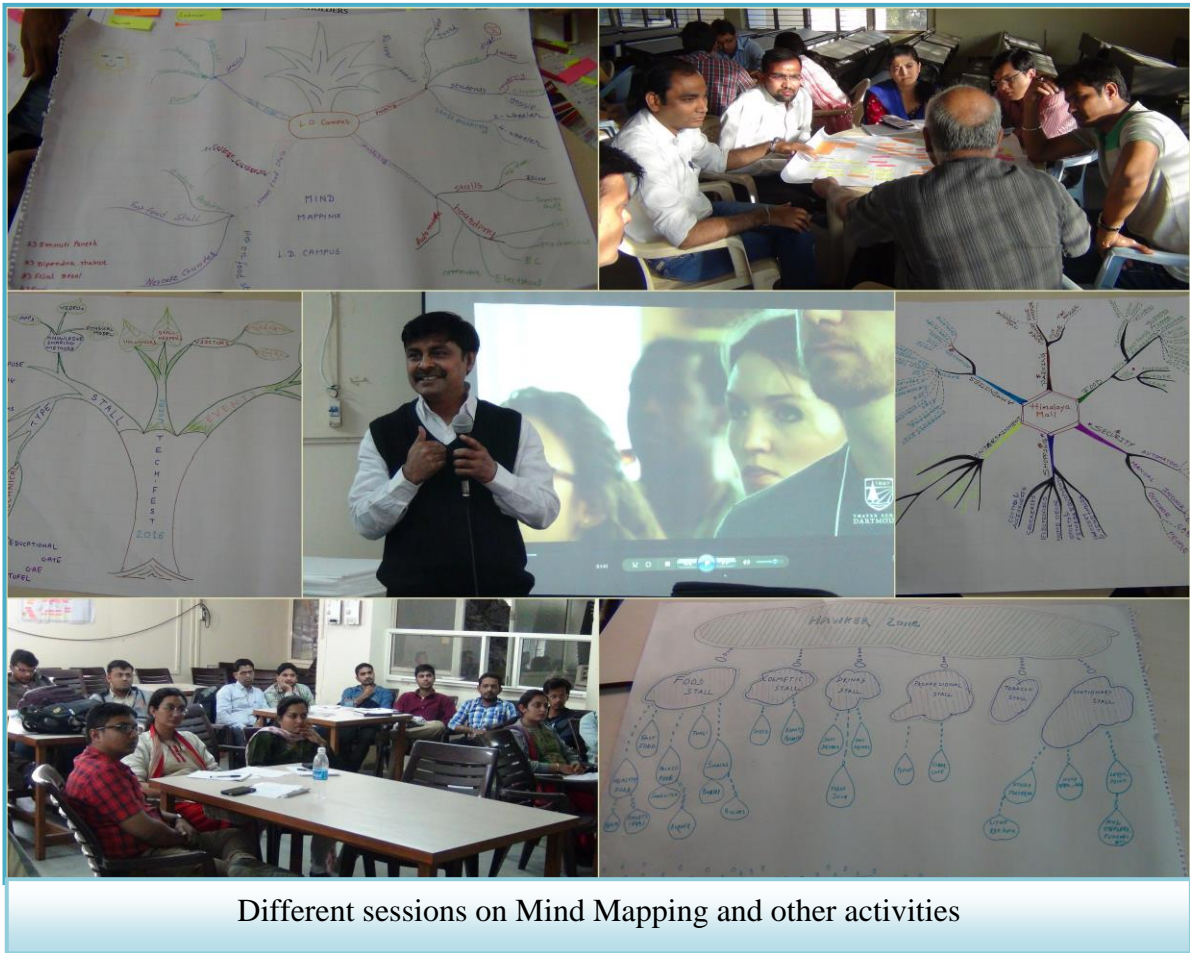
After explaining the methodology in detail, both mentors started explaining Learning Tools that helps to better understand the Design Thinking approach – **tools like Bio Mimicry, System Approach, Analogy, Gestalt Model and Heuristic Approach were explained with examples and case studies.** In the after lunch session, importance of Team Building and Logbook were explained with hands-on exercises. Then, Observation phase was described through AEIOU technique with the help of a Case Study.



Welcome Greetings and Introduction of Design Thinking

Day 2:

On the 2nd day, a discussion about the experience of the first day was initiated and queries of the Faculty Members were solved by the Design Team. After discussion, all the teams were sent for observation in the vicinity of LD Engineering College. They were informed on how to and what to observe- with lots of notes, photographs, videos, interviews and so on.



Different sessions on Mind Mapping and other activities

After returning from field observation, all teams were guided for **Mind Mapping technique** by Mentor, Karmjitsinh Bihola. Mind Mapping is the visual representation technique that includes a central idea surrounded by connected branches of associated topics to better organize your messy data. It helps to better organize, understand, communicate and recall the topics.

Then **Empathy Mapping Canvas** was explained by the mentor; Empathy Map helps to understand and identify the emotional and unmet needs of user. Observation and Empathy process is the foundation of any Design Thinking project and one must spend enough amount of time for this phase by doing observation and interaction again and again.

Then, each team worked on preparation of **AEIOU framework, Mind Map and Empathy Map** for their observation of selected domain with use of canvas, colorful sticky notes, sketch pens and other crafty materials. Every Faculty Member visualized him/herself as a student/learner and started learning the new approach of Design Engineering. Mentors guided the teams personally for filling their canvases and cleared the doubts. After completing the canvas activity, all the teams presented their observation and empathization work to experts and received the comments.



Teamwork, Mentorship, Group Discussion and many more during FDP.....

During the break time, the Faculty Members got energized through networking with each other and discussed common ground level issues faced by them at their institute to further discuss them with Design Team and experts.

Day 3:

Again the 3rd day was started with common discussion about the experience of the second day and queries of the Faculty Members were solved by the mentors. Then **Ideation Canvas** was explained by the mentor, Karmjitsinh Bihola with the help of a presentation. Ideation is the brainstorming and idea generation activity with lots of innovative and creative ideas for the given problem statement. Then as per the User needs, all possible ideas need to be combined and refined for better solution. The Mentor explained how things can be connected to get a better idea.

Then, the Faculty Members started working on their Ideation Canvas. The Ideation canvas comprises of people and activities for observed domain. **Then all activities need to be varied with different situation (What/Which), context (Why) and location (Where) which may be relevant or irrelevant to the selected domain. In the same way random props/tools/products/equipment/technology shall be listed down.** These two things would be completely random. **The problem statement may be completely changed or refined at the end of the Ideation activity as the whole of the Design Thinking process is iterative in nature.** The beauty of a systematic study of Design Thinking is that it breaks all old customs and barriers of identifying and solving problems.

Then **Product Development Canvas** was explained with a small game in which participants need to give ideas on “Design for a Futuristic Toothbrush”. Every one enthusiastically participated in the game and gave excellent ideas for the same. PD canvas comprises the purpose of the project, the User Experience, Product Function, Feature and components of the solution. After completing this canvas, the designers need to verify their ideas (which they have noted down on the PD canvas) with the actual user and modify their concept. Now the iterative process starts again till user needs are met.

Day 4:

After getting basic introduction of Design Thinking Methodology, its tools & techniques and hands on exercises, on the 4th day was introduced the engineering aspects of **Reverse Engineering and Prototyping**. In the first half, the team explained the Reverse Engineering (RE) with the useful tool called **“SCAMPER”** (SCAMPER is acronym of **S**ubstitute, **C**ombine, **A**dapt, **M**odify/**M**agnify/**M**aximise/**M**inify, **P**ut to other use, **E**liminate and **R**evise/**R**everse) and small hands on exercise to better understand the topic. SCAMPER tool can also be used for ideation when one is

not able to move forward and is struck with the ideas or problem. We want to use it for RE. Then the **Learning Needs Matrix (LNM)** was explained; Learning Needs Matrix will help students identify the learning requirements at an early stage along with prioritization of specific learning along with defined time duration/ time allocation for each learning priority. In LNM, mainly out of syllabus topics will be listed out and each topic will be learnt by each team member in order to complete the project. It will also help students to learn Skillsets required by the industry after they graduate out.

In the second half, Prototyping techniques were explained by the experts **Mr. Rohit Swarup and Mr. Amar Gargesh** in details. They discussed how sequential prototype will help to refine the projects as per the user needs. Prototyping could be in any form like **paper model, specific material model, wire mesh, working model, drawings, software model (modeling)**. They said that for the project of ATM machine design, one person may act as the ATM machine, when some button is pressed to see how their final product will work.



Teams are working on Canvases and Prototype exercise

In the valedictory session, all teams talked about their problem statement and unique features of their solution. Experts gave very important suggestions for each design project and concluded the workshop with their expert comments. Then certificates were awarded to all participants for their efforts and active participation in this 4 day FDP of Design Engineering. All Faculty Members promised to organize similar FDPs at their institute for awareness of Design Engineering among their colleagues and students.

The above part of the report describes the Working level FDP.

Advanced Level FDP:

(for those who participated in the second FDP at GTU)

This workshop was mentored and conducted by **Mr. Rohit Swarup & Mr. Amar Gargesh from Innovation & Research Foundation (Futurz Xplored), Ahmedabad**. In the advanced level FDP, new tools and techniques for the whole of the Design Thinking process were discussed. If these tools and techniques were used for different phases of Design Thinking Process, it leads to a deeper learning. The tools like Ethnographic study for observation & documentation; Understanding gaps and providing support for gap areas; Research & Analysis tools; Visualization & Interview Techniques; Lotus Blossom with Mind Mapping; Graphic organizers for knowledge management; Visualization Assignment for observation, problem solving and decision making; SCAMPER; etc. were introduced and practiced. They documented the learning and the whole process can be written in the form of a case study for reference work. If these are made available by the Faculty Members, we shall upload it to the GTU website.

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