



Mechanical Engineering

Aspire

ANNEXURE

Academic workshop

### One day “Design Thinking” Workshop for first year Mechanical Engineering Students

A one day workshop titled “Design Thinking” (DT) was conducted to individual sections of the first year Mechanical Engineering students on 8<sup>th</sup>, 9<sup>th</sup> and 12<sup>th</sup> October 2018. The workshop was mainly aimed at motivating the students towards using DT process to define their **career vision statement** and to achieve **good behavioral change**.

#### 1. About “Design Thinking”

*“Design thinking is a human-centered approach to innovation that draws from the designer's toolkit to integrate the needs of people, the possibilities of technology, and the requirements for business success”.*

*- Tim Brown, President and CEO, IDEO*

*“Education is not the learning of facts, but the training of the mind to think”*

*- Albert Einstein*

DT as a thinking tool, it fosters the ability to combine: “**empathy**” for the context of a problem, “**creativity**” in the generation of insights and solutions, and the skill to “**materialize**” those solutions through iterative prototyping. “Design thinking” has been taught as a course at **Stanford since 2004**. Today design thinking impacts not only in engineering practice, but also in education and across disciplines. Its tools are used by product and industrial design firms to ideate products. It is also used to solve so called “**wicked problems**” – problems for which neither the question nor the answer is well-defined.

#### 2. Design Thinking - Brief

Design Thinking is an iterative process in which we seek to understand the user, challenge assumptions, and redefine problems. This is a conscious attempt to identify alternative strategies and solutions that might not be instantly apparent with our initial level of understanding. In the present scenario, where there is growing complexity and ambiguity, change is the only constant factor and education sector is also embracing the changes.

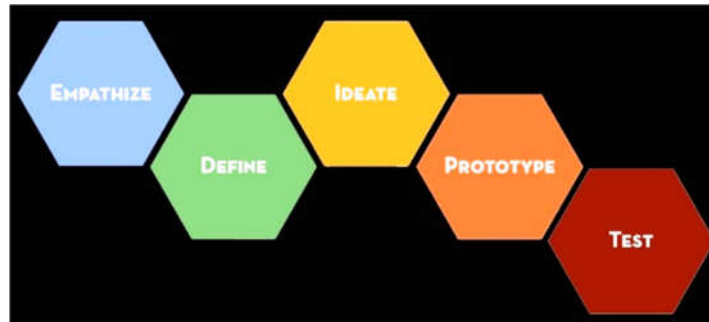
New and smarter ways of learning are replacing the conventional learning styles. Design Thinking is adopted by many educational institutions to create a better Teaching – Learning Experience to their educators and students. In all levels of education today, there are “**Project based Learning**”, “**Activity based learning**”, “**Experiential Learning**” and “**Student Centric Teaching**” practiced to improve the learning experience.

***Educators can apply Design Thinking to improve their work and to provide better “learning experience” to the students they teach.***

The design thinking process can also be used to understand the potential of interdisciplinary collaboration to develop new solutions to complex problems.

### 3. Steps in “Design Thinking”

The five step process involved in DT are shown in the following figure. They are Empathy, Define, Ideate, Prototype and Testing.



### 4. Nature of “Design Thinking”

<b>It is human centered</b>	Design Thinking begins from <b>deep empathy</b> and understanding of needs and motivations of people - in the present case, students
<b>It's Collaborative</b>	Several great minds are always stronger when solving a challenge, than just one. DT benefits greatly from the views of multiple perspectives, and others' creativity.
<b>It's Optimistic</b>	Design Thinking is the fundamental belief that we all <b>can create a solution</b>
<b>It's Experimental</b>	DT gives you permission to fail and to learn from your mistakes, because you come up with new ideas, get feedback on them, then iterate.

### 5. Design thinking: Applications

Design thinking finds its application across a variety of professions. From sports, education and research to business, management and design, design thinking is widely used by professionals around the globe.

- **Education sector:** The education sector can make the best use of design thinking by taking feedback from students on their requirements, goals and challenges they are facing in the classroom. By working on their feedback, the instructors can come up with solutions to address their challenges.
- **Healthcare:** Design thinking helps in healthcare as well. The expenditure on healthcare by the government and the cost of healthcare facilities is growing by the day. Experts worldwide are concerned about how to bring quality healthcare to people at low cost.
- **Information technology:** The IT industry makes a lot of products that require trials and proof of concepts. The industry needs to empathize with its users and not simply deploy technologies. IT is not only about technology or products, but also its processes. The developers, analysts, consultants, and managers have to brainstorm on possible ideas for solving the problems of the clients. This is where design thinking helps a lot.
- **Business:** Design thinking helps in businesses by optimizing the process of product creation, marketing, and renewal of contracts. All these processes require a companywide focus on the customer and hence, design thinking helps in these processes immensely.

*In the present workshop, the students have learnt the fundamentals of DT process and successfully defined their career **vision statement**.*

## 6. Workshop Schedule

The Design Thinking workshop was organized as per the following schedule

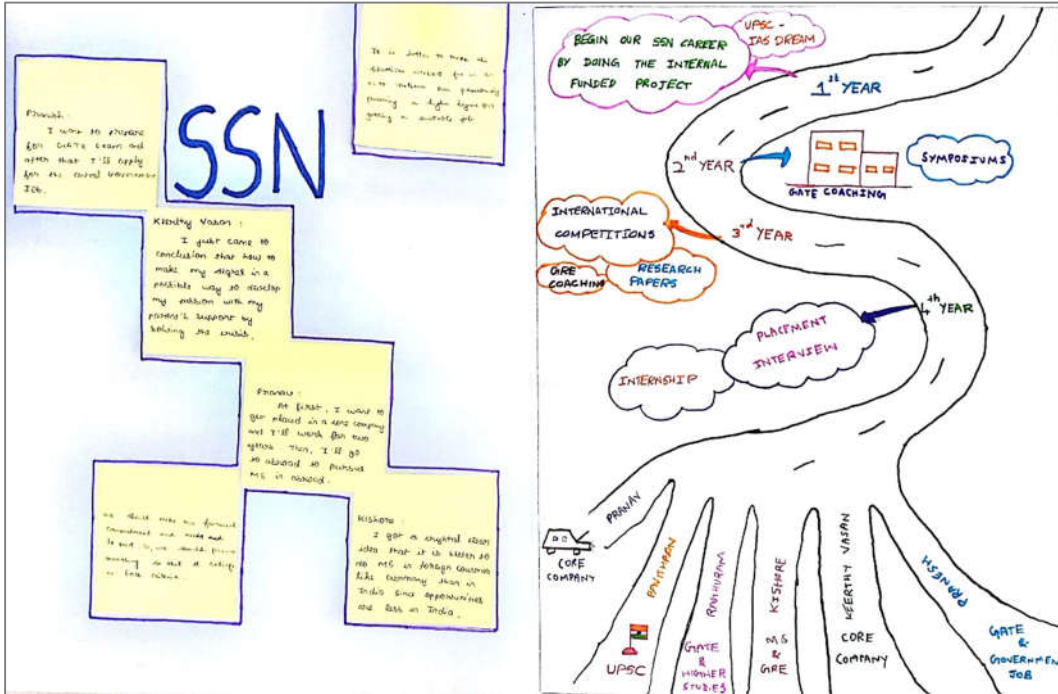
Session	Highlights of the topics	Presentation tools used
Session : 1	<ul style="list-style-type: none"> <li>Introduction to <b>“Power of Thinking Process”</b> (with Albert Einstein’s quotes) and importance of behavioral changes</li> <li>Power of <b>“team work”</b> (with the story of great achievers), Introduction to Design Thinking (DT) process.</li> <li>Steps in DT (Empathize, Define, Ideate, Prototype and Test)</li> </ul>	Videos, stories and simple exercises
Session : 2	Social and academic applications of DT process. <ul style="list-style-type: none"> <li>Invention of <b>“life straw”</b> for rural peoples, Innovative <b>“Train School”</b> to motivate rural children.</li> <li>DT for extreme affordability – Embrace incubator</li> <li>DT in action – <b>Aravind Eye hospital</b>, Tamil Nadu</li> <li>Changing experience through empathy – <b>GE Healthcare</b> system, DT application with <b>“Good Kitchen”</b> case study</li> </ul>	Videos, stories and slides.
Lunch Break	<ul style="list-style-type: none"> <li>During the lunch break, the students were instructed to <b>empathize stake holders</b> such as parents, faculty members, and seniors to collect, understand and identify the possible future career opportunities.</li> <li>Guidelines were also given to frame the interview questions, methods of observation and data collection.</li> </ul>	
Session : 3	Application of DT for students <b>“Personal Vision Statement”</b> <ul style="list-style-type: none"> <li>Mind mapping exercises (Spot the animals in the image and Puzzles)</li> <li>Future placement opportunities in the field of Mechanical Engineering, central Government jobs, Higher studies, management jobs, research work etc.,</li> </ul>	Videos and slides
Hands on training was given to the students to understand the importance of <b>“IDEATE”</b> and <b>“DEFINE”</b> stages from their collected interview data.		
Session : 4	How to beautify individual students resume through achievements? Achievement sharing of passed out seniors:  The <b>self-recorded videos</b> of passed out seniors were played to share their achievements and motivation behind their success. The achievers are <ul style="list-style-type: none"> <li><b>Akshay IB</b> (doing MS at Germany) : <b>Mechanical Engg</b></li> <li><b>Guru Pranesh (Working at industry, Hyderabad)</b> : <b>Mechanical Engg</b></li> <li><b>Akshay Aravindan</b> (doing MS at Stanford) : <b>Mechanical Engg</b></li> <li><b>Abhishek Narayanan</b> (Doing PhD at Oxford university) : <b>Chemical Engg</b></li> </ul>	<b>Self-recorded Videos</b> of seniors and slides
Session : 5	<b>Team presentation:</b> guidance was given to individual student team to develop prototype and present their vision statement to other batches.	Team <b>prototype</b>

### Sample 1: Defining vision statement from Empathy data

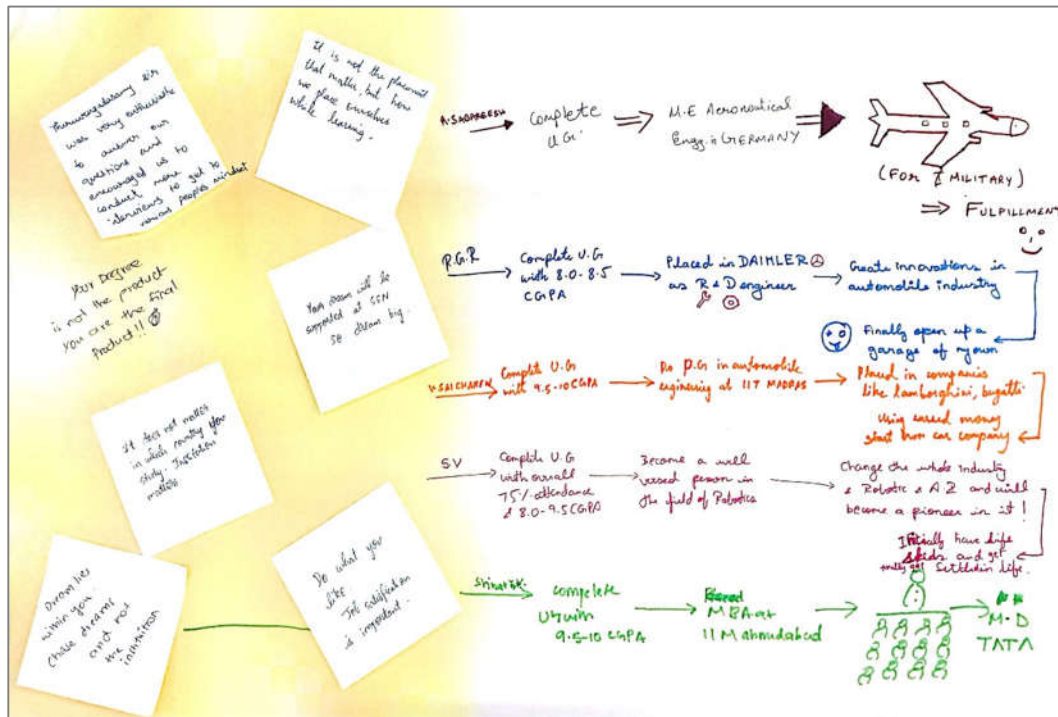
The data obtained during the interview process was grouped and recorded on the sticky notes. Guidelines for brainstorming was given to each batch to exactly define their vision statement of individual student or group. The sample sheets (1,2 and 3) are shown below.



**Sample 2: Defining vision statement from Empathy data**



**Sample 3: Defining vision statement from Empathy data**



## 7. "Design Thinking" Workshop Snapshots



(a) Introduction about the workshop –  
HoD Mechanical Engg



(b) Interaction with students –  
Dr. S. Suresh Kumar



(c) Students while doing Brainstorming



(d) Students while preparing prototypes  
(e)



(f) Students Team Presentation -1



(g) Students Team Presentation -2



**Students Team Presentation - 3**



**Students Team Presentation - 4**



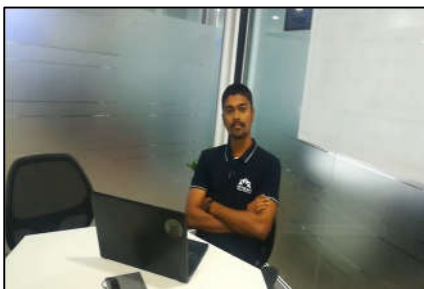
**Students Team Presentation - 5**



**Students Team Presentation - 6**

### **8. Self-recorded video presentations of passed out students (Achievers)**

DT team of Mechanical Engineering express our sincere thanks to the following passed out students who has shared their valuable experience to their juniors.



**Mr. Guru Pranesh  
(Working in industry)**



**Mr. Abhishek Narayanan  
(Oxford University)**



**Mr. Akshay IB  
(Doing MS at Germany)**

## 9. Tracking of Personal Vision Statement (PVS)

In order to motivate the students towards achieving their personal vision, an exclusive form was developed by **Dr. Ve. Annamalai**. The students were instructed to complete the form and keep tracking the points which they have mentioned. Some of the sample personal vision statements are shown below.

### 9a. Personal Vision Statement of **Mr. G. Nithyanandh** (To become an Entrepreneur)

Personal Vision Statement of **G. NITHYANANDH**  
Developed on 29-10-18

On completion of my Graduation, I want to  
get placed in a good core company and also to  
become a entrepreneur

In order to achieve this, I commit myself to do the following

<b>PLACEMENT</b>	<b>ENTREPRENEUR</b>
* Maintaining good CGPA (8-9)	* To have a good knowledge
* Publishing atleast one research paper	in modelling and simulation
* Good knowledge in core companies	softwares

*(Signature)*  
Signature

### 9b. Personal Vision Statement of **Mr. K.S Murugaraja** (To do M.S in abroad)

Personal Vision Statement of **K.S.MURUGARAJA**  
Developed on 29.10.2018

On completion of my Graduation, I want to gain work  
experience for 1 year and do MS, in abroad.

In order to achieve this, I commit myself to do the following

<b>Placement</b>	<b>GRE</b>
1. Should maintain CGPA 8.5-9.5	1. Should maintain CGPA 8.5-9.5
2. Should do atleast 1 patent	2. Should prepare for GRE
3. Should do atleast 1 publication	from 5 <sup>TH</sup> semester.
	3. Should do atleast 1 patent
	4. Should do atleast 1 publication.

*(Signature)*  
Signature



**9c. Personal Vision Statement of Mr. Kishore. M.G (M.S in Germany)**

Personal Vision Statement of Kishore .M.G.,  
Developed on ~~12-10-2018~~ 29-10-2018

On completion of my Graduation, I want to do M.S. in any well-reputed university preferably in Germany.

In order to achieve this, I commit myself to do the following

1. Maintain CGPA between 8.5 and 9.5
2. Complete at least one research paper
3. Start my GRE preparations from third year

M.G. Kishore  
Signature

**9d. Personal Vision Statement of Mr. M. Pavithran (Aiming core company placement)**

Personal Vision Statement of M.PAVITHRAN  
Developed on ~~12-10-2018~~ 29/10/18

On completion of my Graduation, I want to get in one of the core companies like Ford, Hyundai etc and build my career.

In order to achieve this, I commit myself to do the following

1. maintain CGPA 9-10
2. Publish at least 1 research paper.
3. involve in numerous projects.

M.P.  
Signature

9e. Personal Vision Statement of Mr. K.S Manoj Kumar (MBA in IIM)

Personal Vision Statement of K.S. MANOJ KUMAR  
Developed on

On completion of my Graduation, I want to  
do M.B.A in IIM (A, B or C)

In order to achieve this, I commit myself to do the following

1. Maintain 8-9 CGPA in all semesters.
2. Start aptitude preparation from 2<sup>nd</sup> year
3. Attend CAT coaching classes from 3<sup>rd</sup> year

Manoj Kumar  
Signature

9f. Personal Vision Statement of Mr. Kevin Christopher (MS abroad)

Personal Vision Statement of A. Kevin Christopher  
Developed on 29/10/11

On completion of my Graduation, I want to <sup>work</sup> have one year  
experience and study M.S in a university in swizz  
countries

In order to achieve this, I commit myself to do the following

- (i) I must maintain CGPA above 8.5-9.5
- (ii) I must start practicing R&D in third year
- (iii) I must have atleast one patent and  
a paper published

Signature  
Kevin

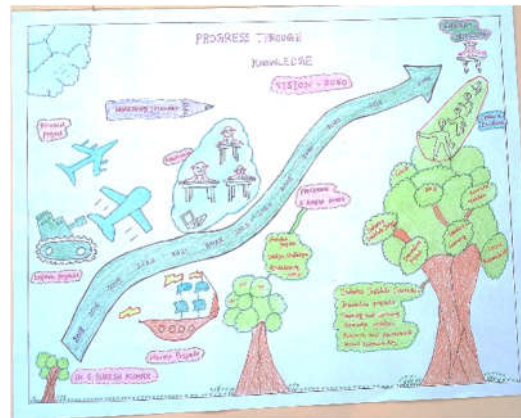
**10. Efforts taken by the Faculty Members:** In order to implement the concept of “**Design Thinking**” to our institution, faculty members attended various faculty development held at Chennai (**Intellect Design Arena Ltd**) and Coimbatore (**CIT**).The details of the FDP are shown below.

**Dr. N. Lakshmi Narasimhan** and **Dr. S. Suresh Kumar** attended a three day faculty development program on “**Design Thinking**” organized by **Intellect Design Arena Ltd, Chennai** on May 9<sup>th</sup> to 11<sup>th</sup> 2018. Presently, Intellect Design Arena Ltd, has been pioneers in this area and they have been working on design mind and design thinking application for several years.

The coordinators of the FDP have assured their cooperation and support for further extension of this course to the academic institutions. Thanks to **Dr. Anbu Rathinavel, Head – School of Design Thinking & Chief Design Officer** - Intellect Design Arena Ltd, for his interest towards academic institutions to attend the FDP.



DT workshop at Intellect Design Arena Ltd



Career Road map preparation

On July 26<sup>th</sup> and 27<sup>th</sup> 2018, **Dr. S. Suresh Kumar** has attended two days workshop on “**Design Thinking for Engineering Educators**” at **CIT Coimbatore**. The program was organized by Teaching Learning Center (TCL) of CIT, Coimbatore. **Dr. Vinay Dabholkar**, guest faculty of IIM Bangalore and IIT Bombay has conducted the entire sessions. The workshop mainly focused the importance of new and smarter ways of learning methodologies for educational institutions. The prototyping stage along with the team members are shown below.



DT prototype stage



DT workshop at CIT Coimbatore



DT team at CIT Coimbatore

## 11. Next Steps in DT

### a) Training For Students

Year	Person	Purpose
All First year students of other branches	Dr.S.SureshKumar	DT for Personal Vision Creation, before completion of First Semester
Students of Third year Mechanical	Dr.N.LakshmiNarasimhan	DT for Product Development, for use in their Design and fabrication Project of Sixth Semester

### b) Training For Faculty

Awareness Program for all faculty

Train the trainer program for select faculty covering all departments.

Discussions are on with External training agencies, and will be finalised soon.

### Acknowledgements

Our Thanks to our Management Team for ushering in and supporting this new concept in SSN.

It was Mrs. Kala Vijayakumar, President, who spearheaded this idea of bringing in DT, as a major differentiator, once we became Autonomous. She had exclusive visit to IITM, along with senior Professors, to meet Dr.Srikanth Vedantam, Head of Engineering Design department and had a firsthand info on how to introduce DT concepts into Engg. Dr. Srikanth Vedantam also visited SSN to create awareness among faculty.

Mr. B. Srinivasan, Dean Management Studies, identified Intellect Design Arena as a potential training company for initiating some of our faculty into DT.

Dr. S. Salivahanan, Principal, identified Dr. Vinay Dhabolkar to support us on DT and nominated us to CIT for training program on Design Thinking for Faculty.