MVJ COLLEGE OF ENGINEERING
Since 1982
Engineering A Better Tomorrow
An Autonomous Institute

Tomorrow's Engineers Club Event

Tomorrow's Engineers
Inspiring creativity, aspiring growth

Affiliated to Visvesvaraya Technological University, Belagavi
Approved By AICTE, New Delhi
Recognized by UGC with 2(f) & 12(B) status
Accredited by NBA and NAAC

INSTITUTION'S INNOVATION COUNCIL
(Ministry of HRD Initiative)

A 3-day Workshop on 'Creative Thinking, Innovation and Problem-Solving'

Dates of the Event	15.12.2020 to 17.12.2020
Title of the Event	A 3-day Workshop on 'Creative Thinking, Innovation and Problem Solving'.
Organized by	Tomorrow's Engineers Club & IQAC, MVJCE
Name of the Coordinator	Dr. Sanchari Saha, HoD, Dept. of ISE Prof. Kavyashree C, HoD, Dept of CSE
Resource Speakers	•Dr. K Sudhakar, Professor (Retd.), Department of Aerospace Engineering, IIT Bombay •Dr. A S Shaja, Director, Data Science, Envestnet Yodlee, San Francisco, USA.

Considering societal problems as one of the major concerns of future engineers, the 'Tomorrow's Engineers Club' of MVJCE conducted a 3-day Workshop on 'Creative Thinking, Innovation and Problem-Solving', from 15.12.2020 to

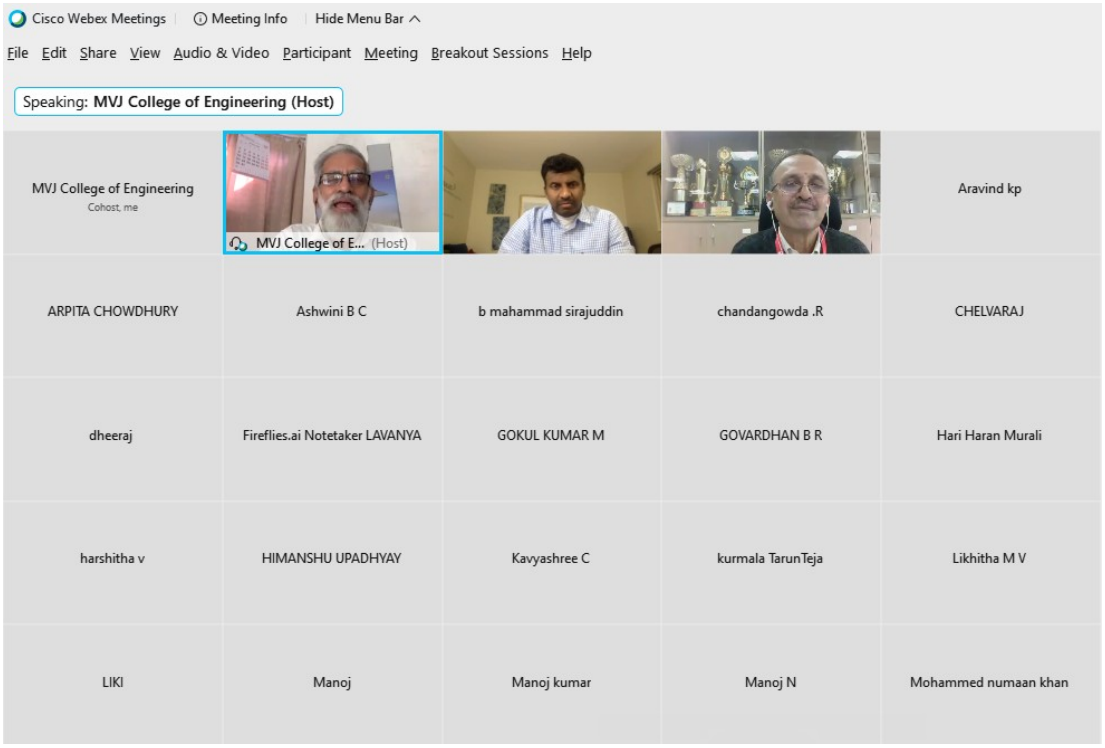
17.12.2020, in virtual mode. The main objective of this workshop was to provide a platform to students from all the disciplines to work together, utilize the skill sets of each discipline, think out-of-the-box, and present solution ideas to various open-ended societal problems that are present in our surroundings. Six interdisciplinary groups were formed; each group identified a societal problem and presented its solution.

Day 1 (15.12.2020):

The workshop was inaugurated by Dr. P Mahabaleswarappa, Principal, MVJCE. In the welcome address, the principal has emphasised on innovation to execute creative ideas.

Followed by the welcome address, Dr. Sanchari Saha, offered a brief introduction about Tomorrow's Engineers Club, its objectives and policies.

The resource speaker for the 1st day of the workshop was Dr. K Sudhakar, Professor (Retd.), Department of Aerospace Engineering, IIT Bombay. He has discussed the importance of creativity and innovation in problem solving.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Speaking: MVJ College of Engineering (Host)
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MVJ College of E... (Host)
Aravind kp
ARPITA CHOWDHURY
Ashwini B C
b mahammad sirajuddin
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GOKUL KUMAR M
GOVARDHAN B R
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Kavyashree C
kurmala TarunTeja
Likhitha M V
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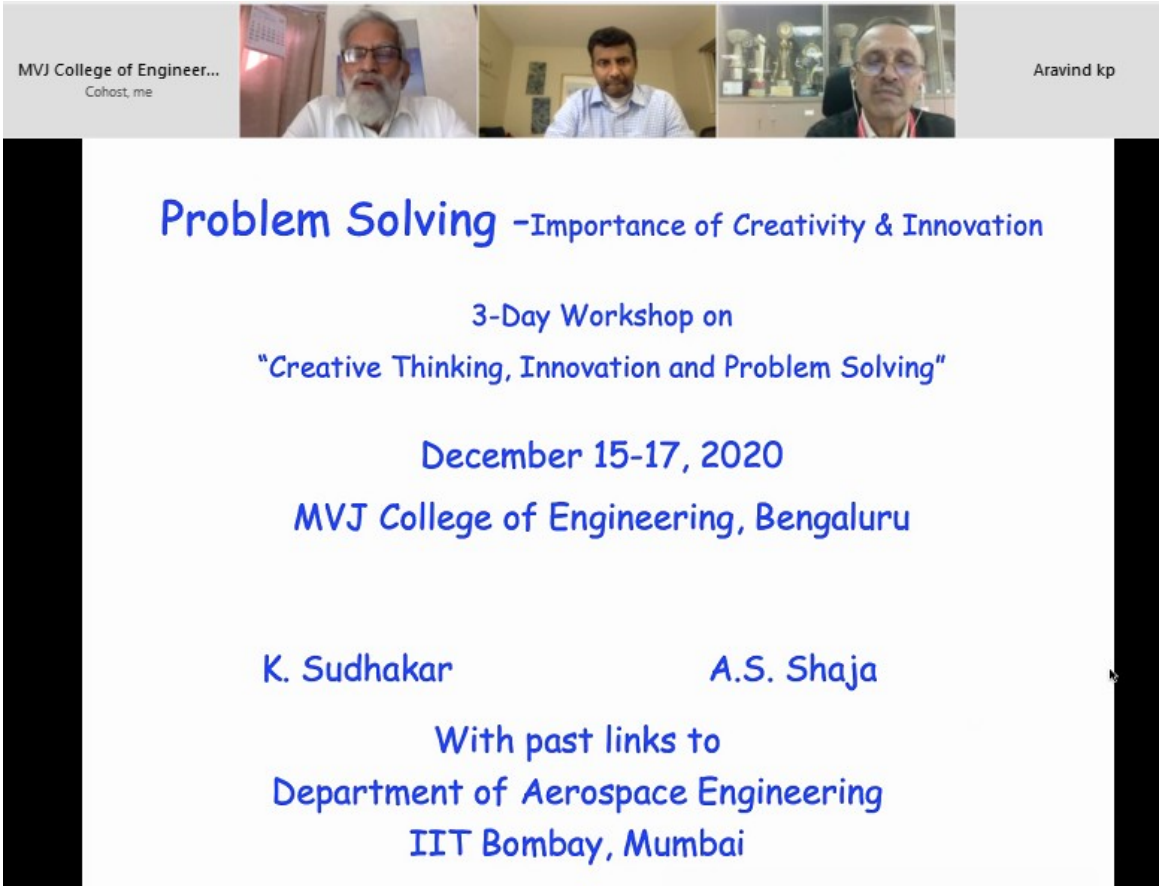
Manoj
Manoj kumar
Manoj N
Mohammed numaan khan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Problem Solving -Importance of Creativity & Innovation
3-Day Workshop on
"Creative Thinking, Innovation and Problem Solving"
December 15-17, 2020
MVJ College of Engineering, Bengaluru
K. Sudhakar
A.S. Shaja
With past links to
Department of Aerospace Engineering
IIT Bombay, Mumbai

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Problem Solving – Importance of Creativity & Innovation

1. Context: Engineering
2. Target audience: 3rd + 5th Semester
3. Goal for the Workshop:

How to?

Idea → Product

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Science, Engineering, Design, Product

Science	Understanding what is there
Engineering	Using knowledge of science, ... creating what isn't there
Design	Engineering with user/customer focus
Product	Design with business in mind

Who will use it?
How will it be used?
What will be expected?

How many will be sold?
How much profit?
Can a business sustain?

Pop-Up

Problem Solving?

Different from solving 'Closed Problem' we are used to!

- Closed Problem
  - Clear/unambiguous problem statement
  - All data required to solve is part of the problem
  - Steps involved similar to problem solved in book/class
  - One correct answer
- Open Problems
  - Drive clarity into problem statement
  - Intelligent gathering of some data
  - Identify steps as part of solution process
  - Justify the interpretation of problem, assumed data, adopted steps to solve it and the answer

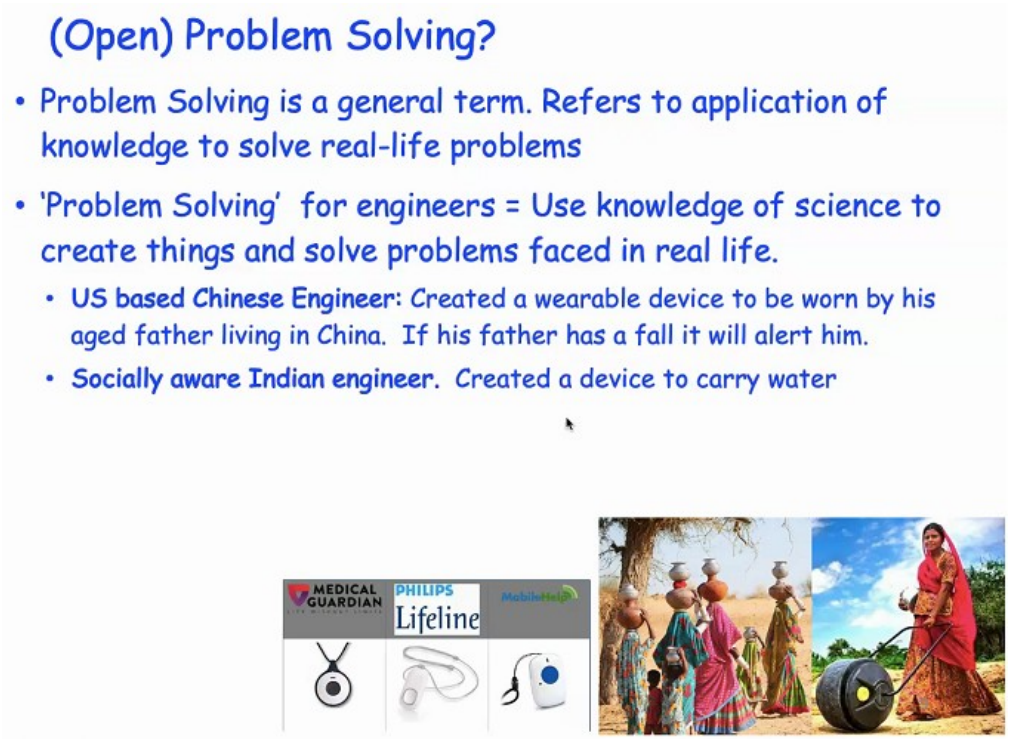
Uday	
Fireflies.ai Notetaker LAVANYA	
MVJ College of Engineering	
paras nath choudhary	

✓Correct Answer

Q2.Simple Open Problem: Require a float to help 100 people to cross a lake. What weight carrying capacity (in kg) of float will you make?

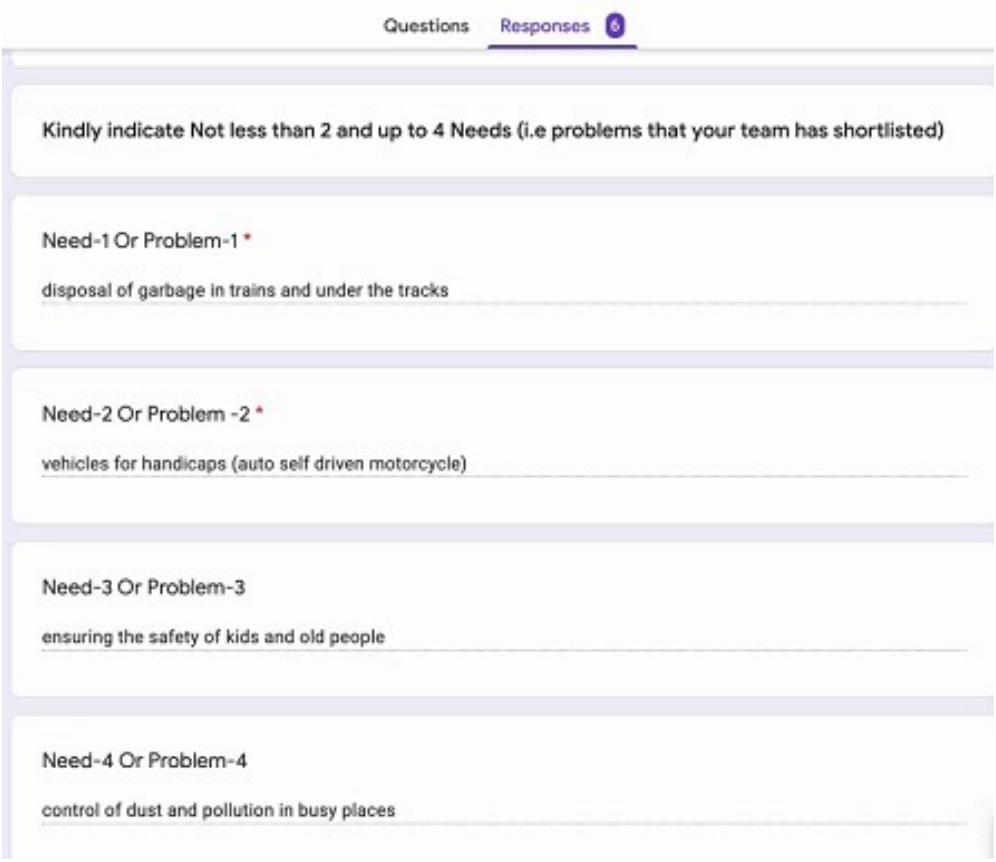
	Answers	Results	%
✓	Your Answer	0/40	0
	1 ton	1/40	3
	100Kg	1/40	3
	1000kg	2/40	5
	depends on individual weights	1/40	3
	70to90 kg	1/40	3
	80kg	1/40	3
	10000kg capacity	1/40	3
	How can we reduce air pollution using technology ?	1/40	3
	we dont have enugh information to answer iwe can assume and make a boat of average weight of 100kg	1/40	3
	70,000	1/40	3
	dependes on the people weights	1/40	3
	100	1/40	3
	100*(average weight of each person)	1/40	3
	less than the wieght of 100 ppl	1/40	3
	1000	1/40	3
	around 8000kg . considering average weight of each person 75kg	1/40	3
	if we assume avrerage weight of 100 people as 50 kg ,then depending on the various parameters it	1/40	3
	No Answer	22/40	55

Attendees	Results
Likhitha M V	
Mohammed numaan khan	Your Answer ✓
Shebin Joseph	How can we reduce air pollution using technology ?
Likitha	
Ashwini B C	
Premanand	around 8000kg . considering average weight of each person 75kg
almisbah	80kg ✓
paras nath choudhary	100*(average weight of each person)
Amrutha MC	
Theertha	70,000
harshitha v	1000kg
Sneha R P	
Theertha	

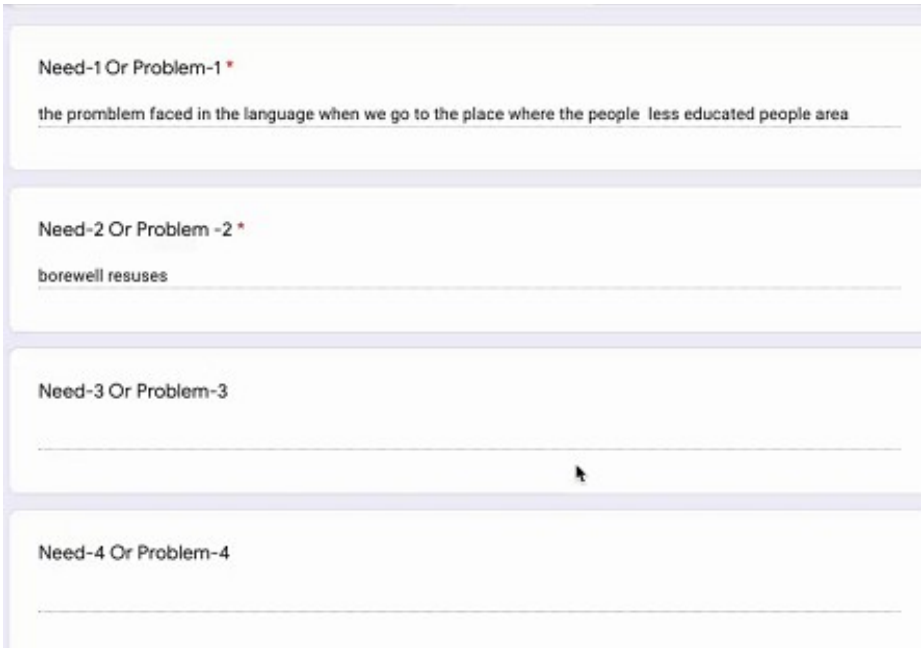


After the descriptive session by Dr. K Sudhakar, students were allotted separate meeting room for discussion among their group members. After the discussion session, students have listed multiple problem statements.

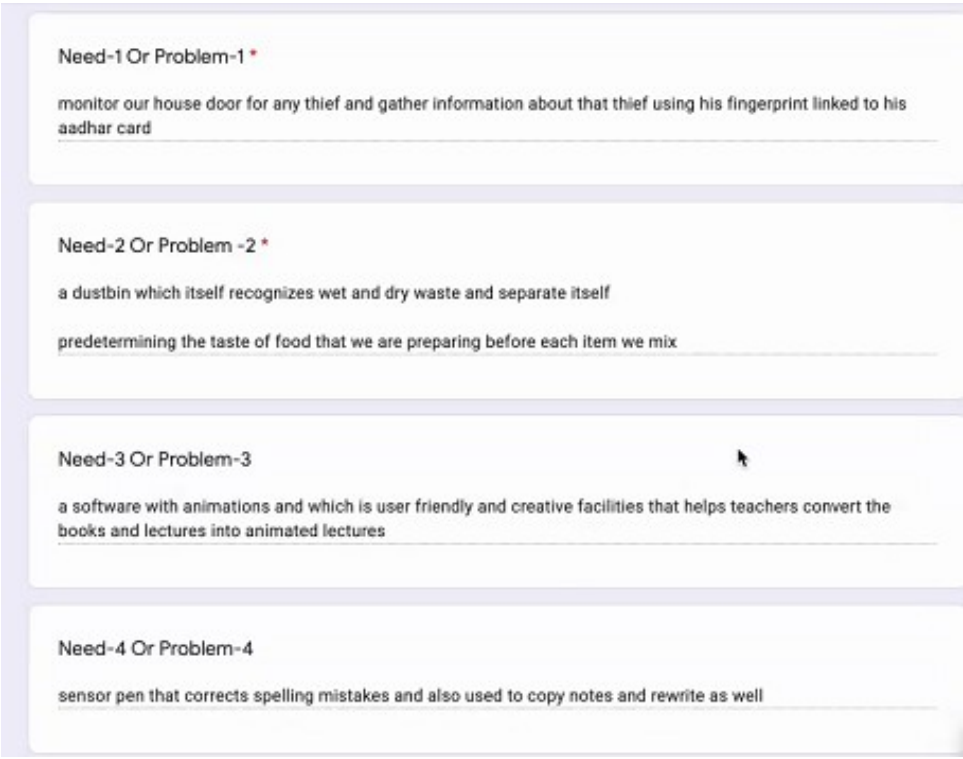
Team 1 Proposed Problem Statements:



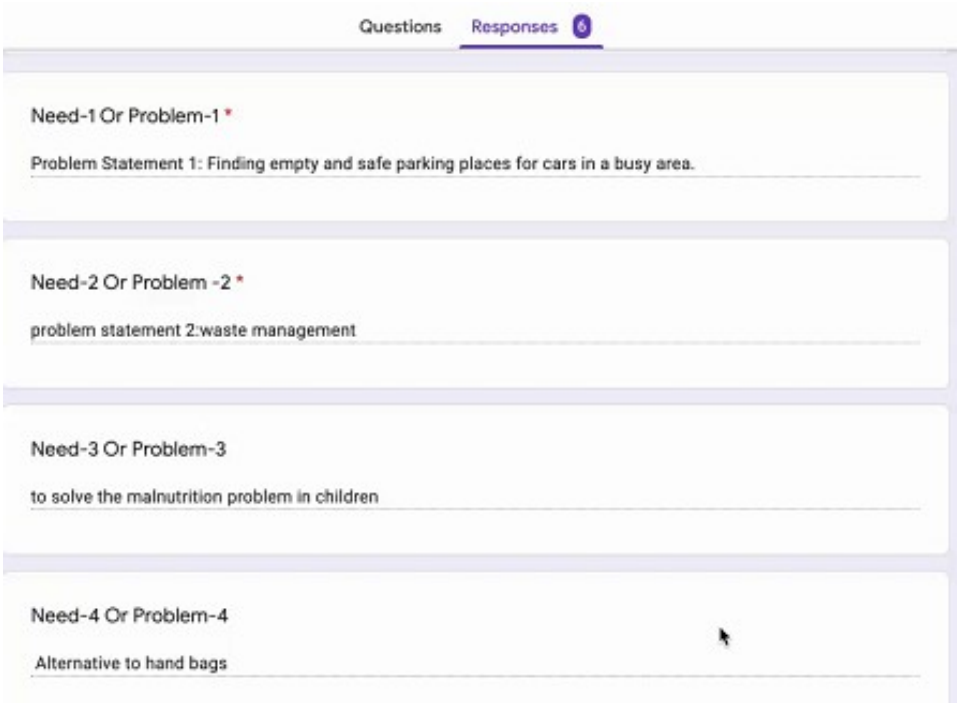
Team 2 Proposed Problem Statements:



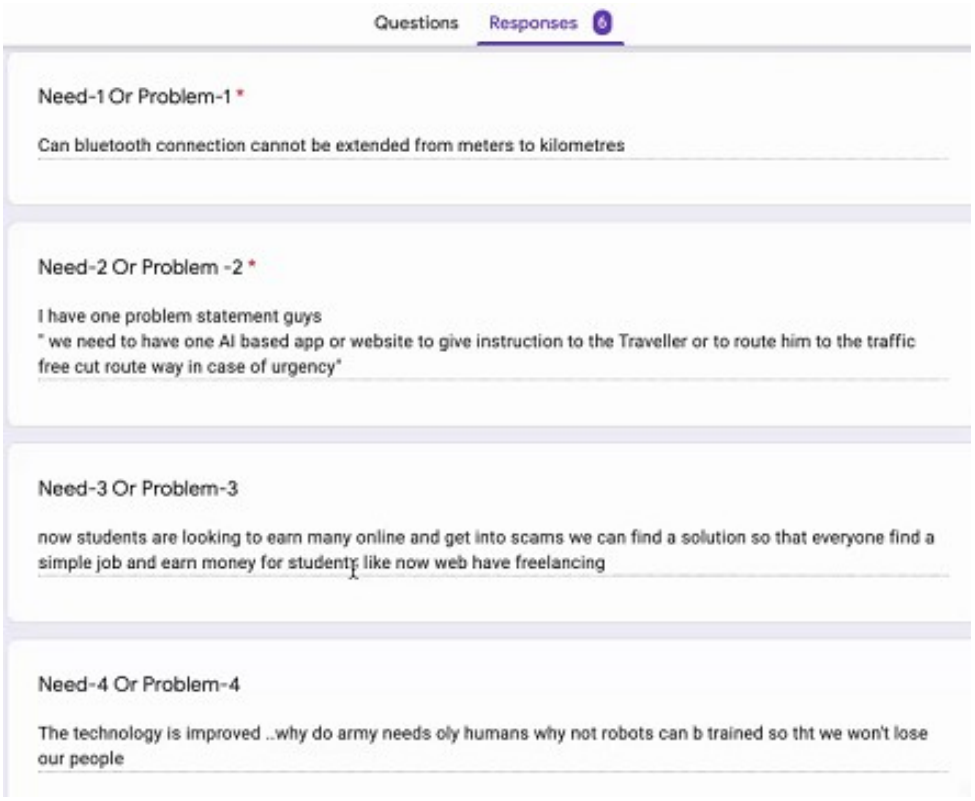
Team 3 Proposed Problem Statements:



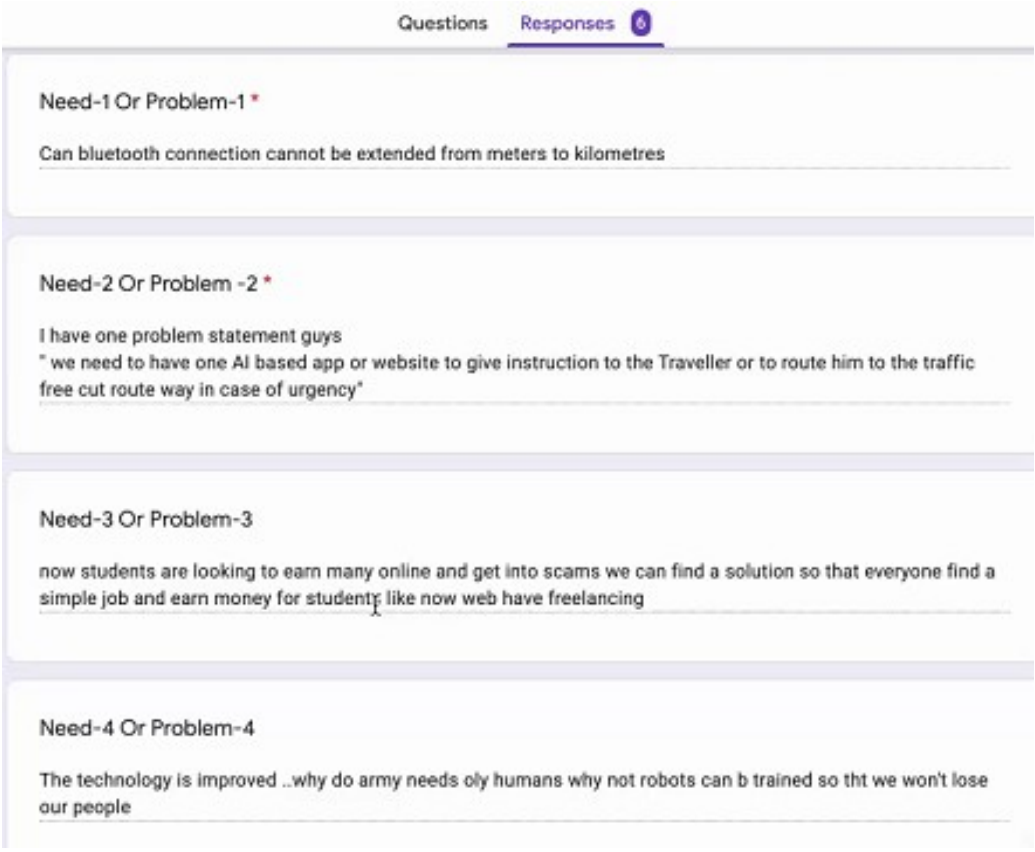
Team 4 Proposed Problem Statements:



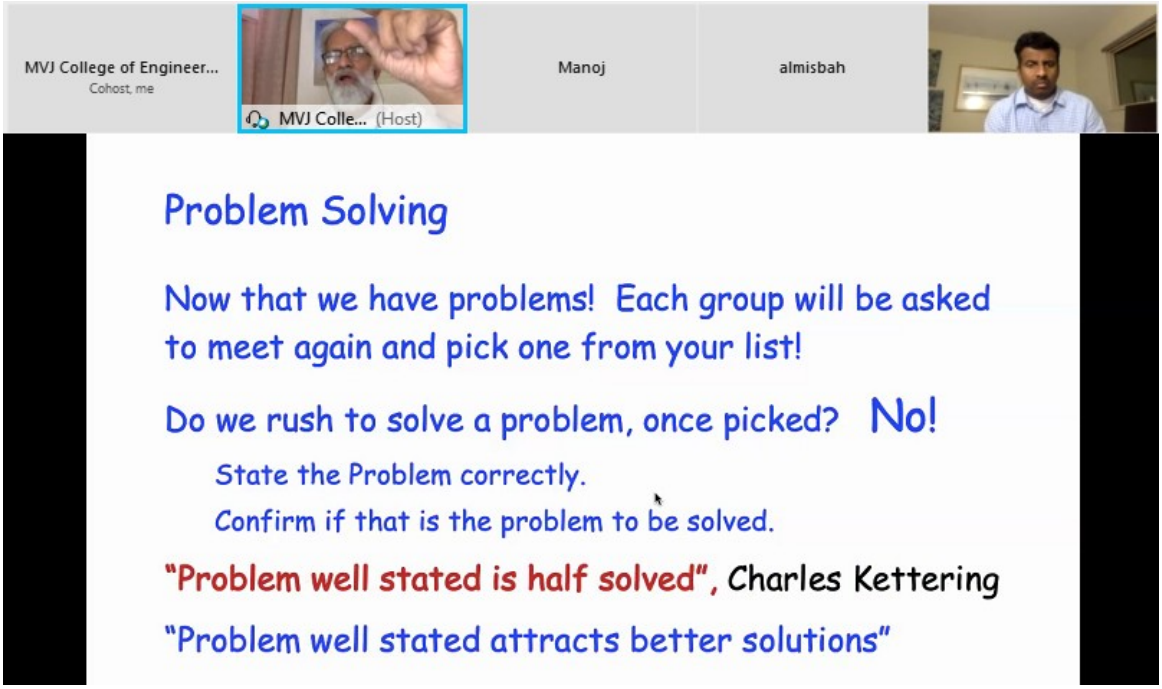
Team 5 Proposed Problem Statements:

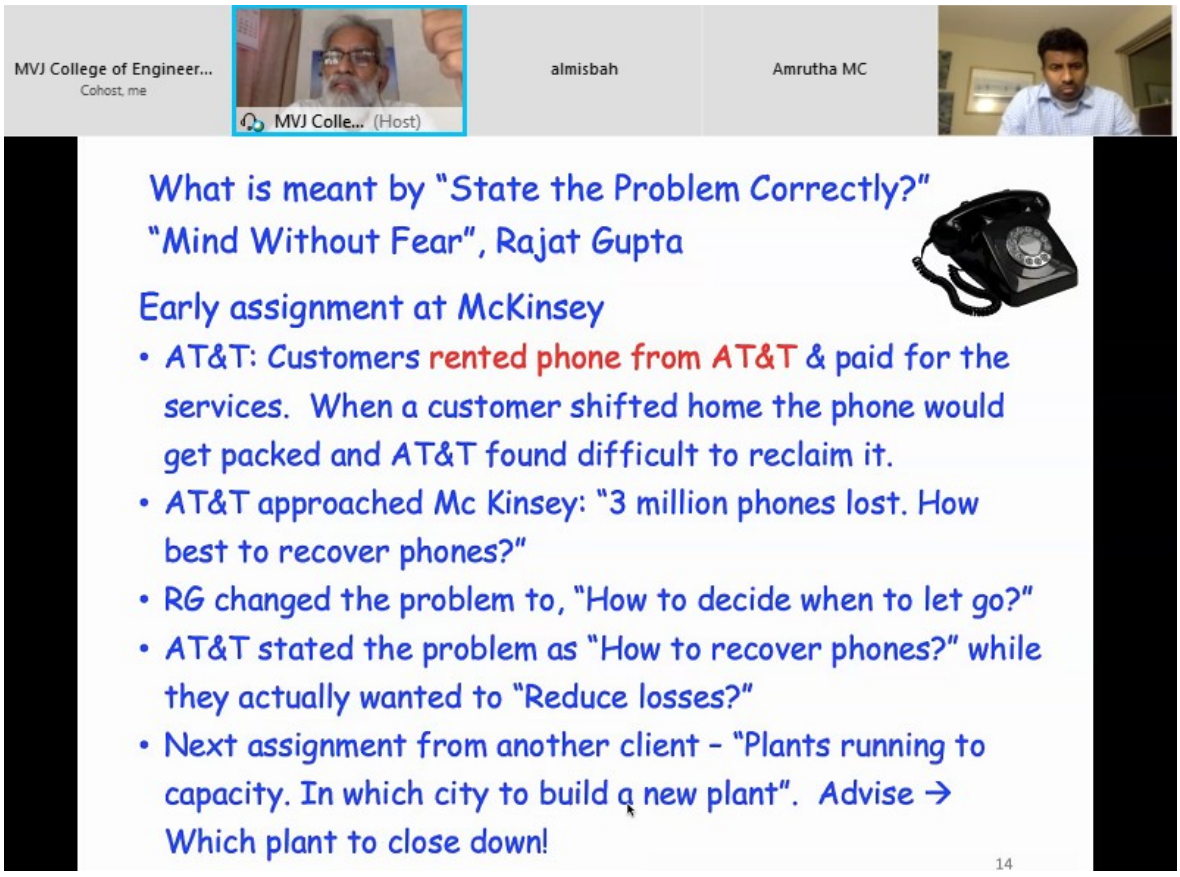


Team 6 Proposed Problem Statements:



Followed by listing multiple problem statements, Dr K Sudhakar explained to the participants about refining the problem statements and finalizing a single problem statement.





List of Finalized Problem Statements:

Group 1: Garbage disposal in railways

Group 2: Problems faced by blind persons

Group 3: Segregation and Management of Waste

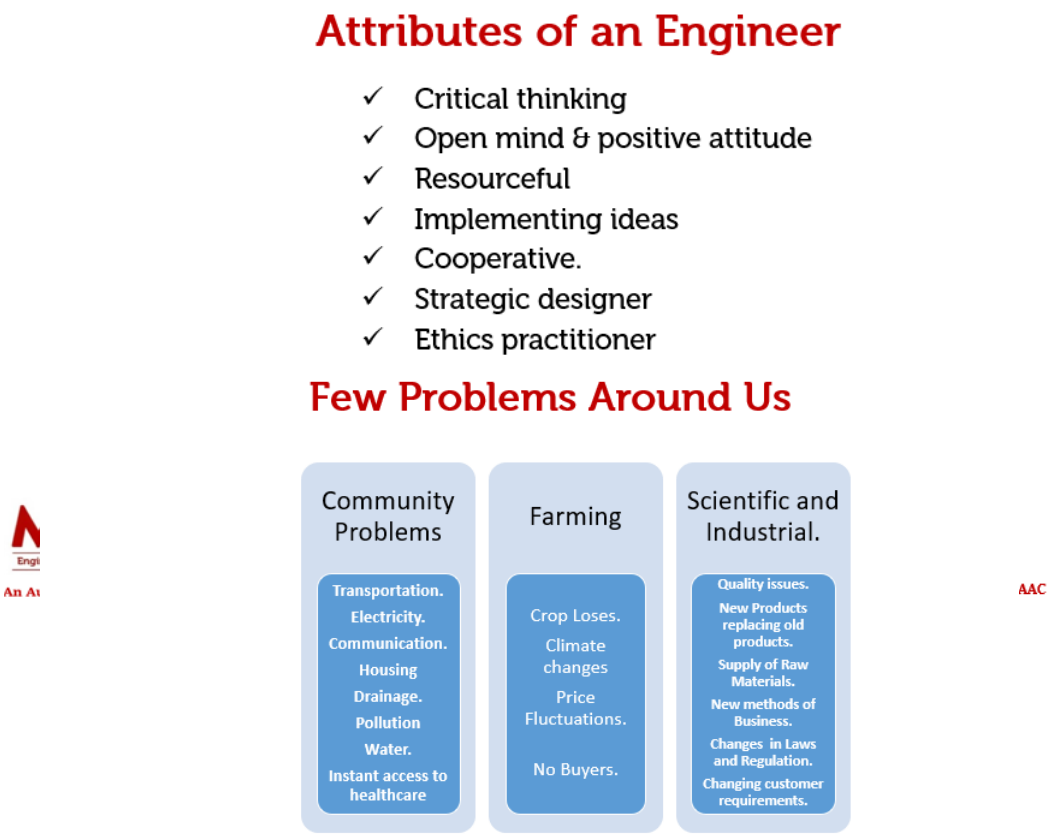
Group 4: Finding empty and safe parking places for cars in the busy area.

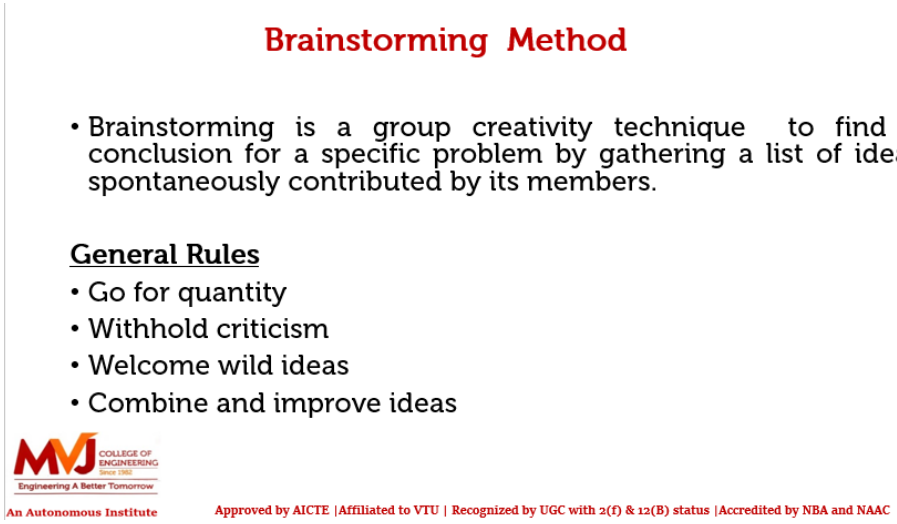
Group 5: About freelance for students and public

Group 6: Food delivery app for small towns and cities

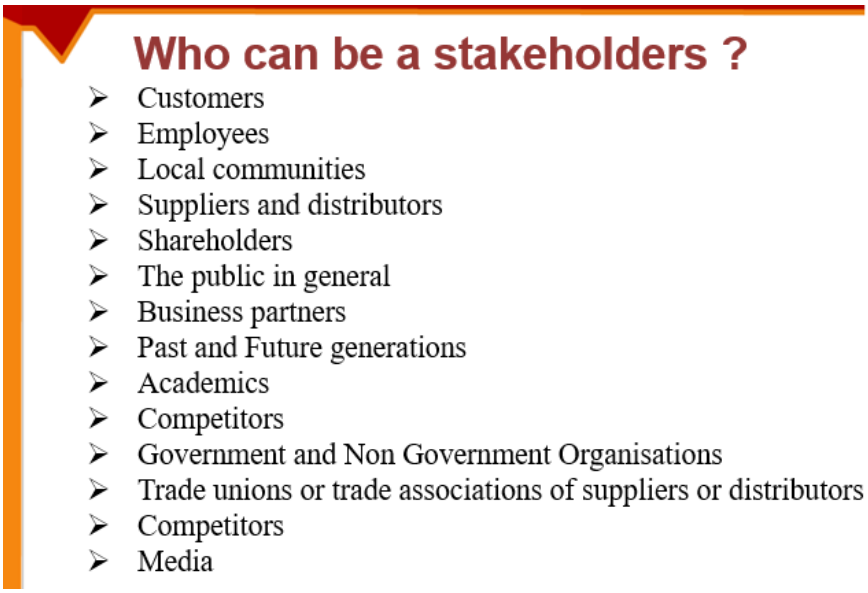
Day 2 (16.12.2020):

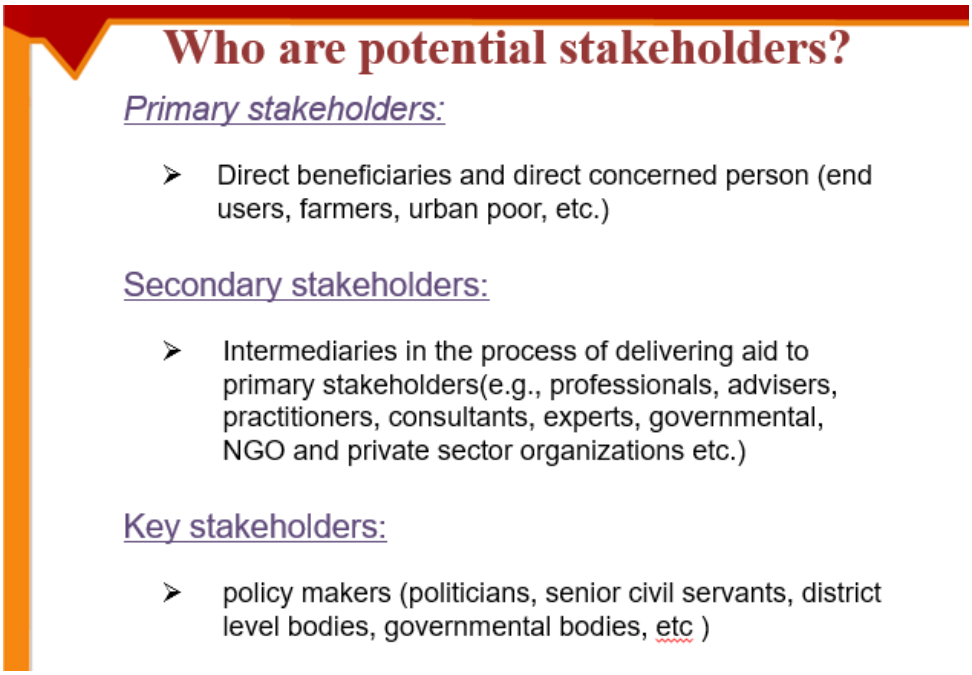
The mentors for the 2nd day of the Workshop were Dr. Sanchari Saha & Prof. Kavyashree C. Dr. Sanchari Saha explained about engineering, attributes of an engineer and its usefulness of brainstorming on identification of issues around us.



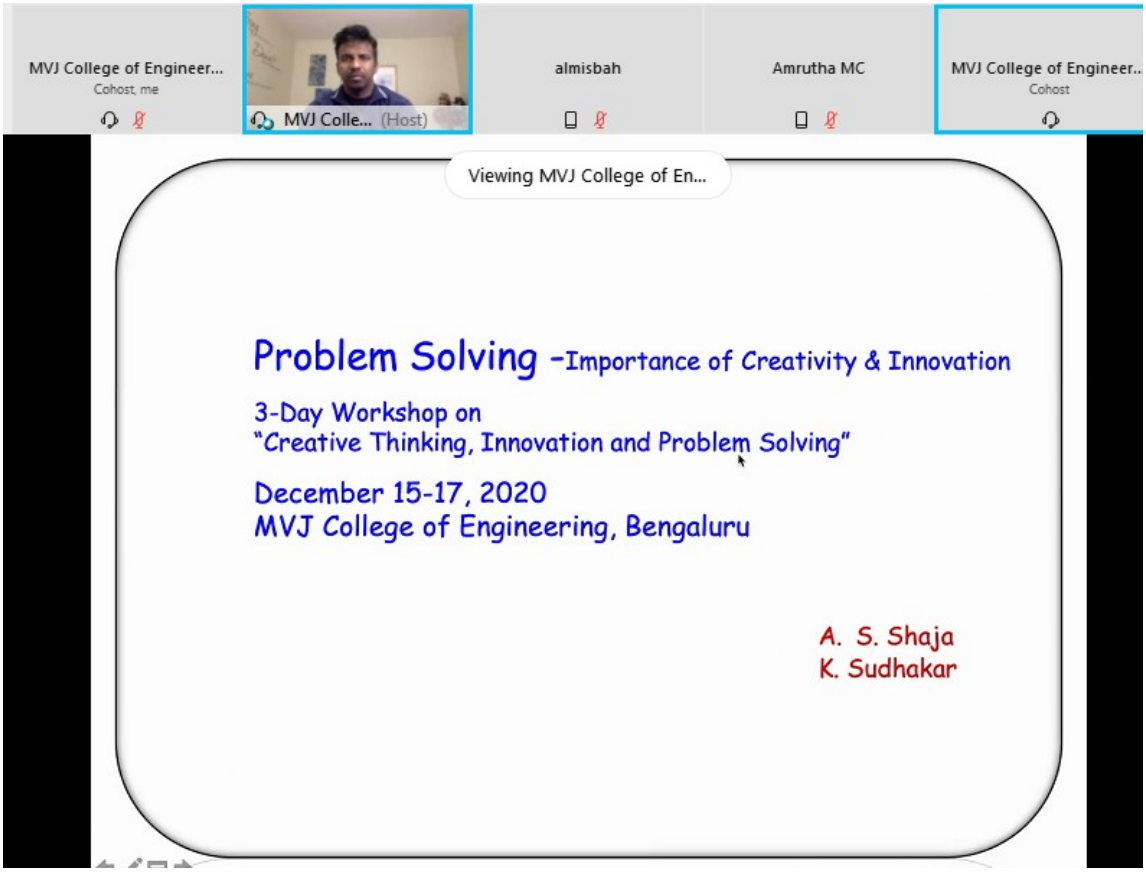


Prof. Kavyashree C explained the participants about Importance of stake holders in problem solving.





Followed by the forenoon session, Dr. A S Shaja, explained the participants about usefulness of brainstorming session in improvising the identified problem statement.



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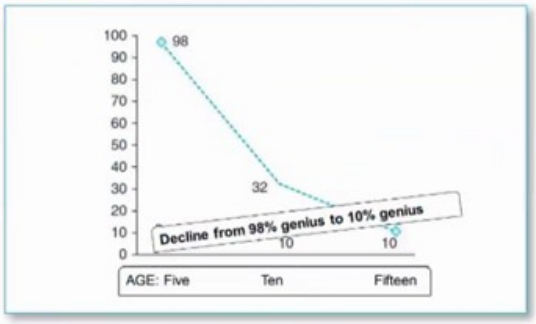
Do schools kill creativity?

TOMORROW'S ENGINEER

- Public school systems were shaped by the needs of the Industrial Revolution for factory workers

Figure 0.1 Decline of Ceativity by Age



SOURCE: Land & Jarman, 1992.

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	Starting Shapes	Completed Drawing	
		More Creative	Less Creative
Use		 Mickey Mouse	 Chain
Combine		 King	 Face
Complete		 A fish on vacation	 Pot

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Functionality Framework

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	Old Functionality	New Functionality
New Technology	Process Improvement	Breakthrough Innovation
Old Technology	Commodity	Product Improvement

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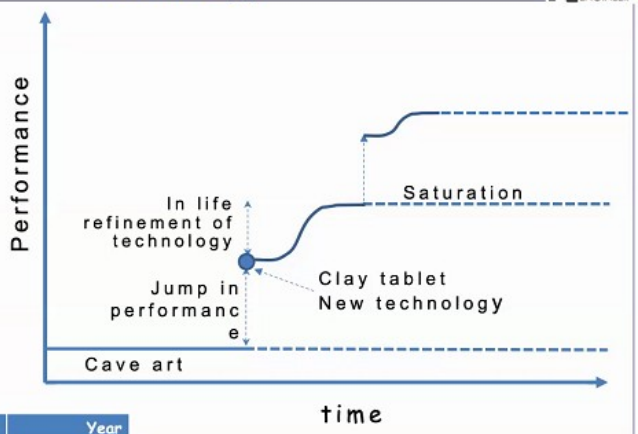
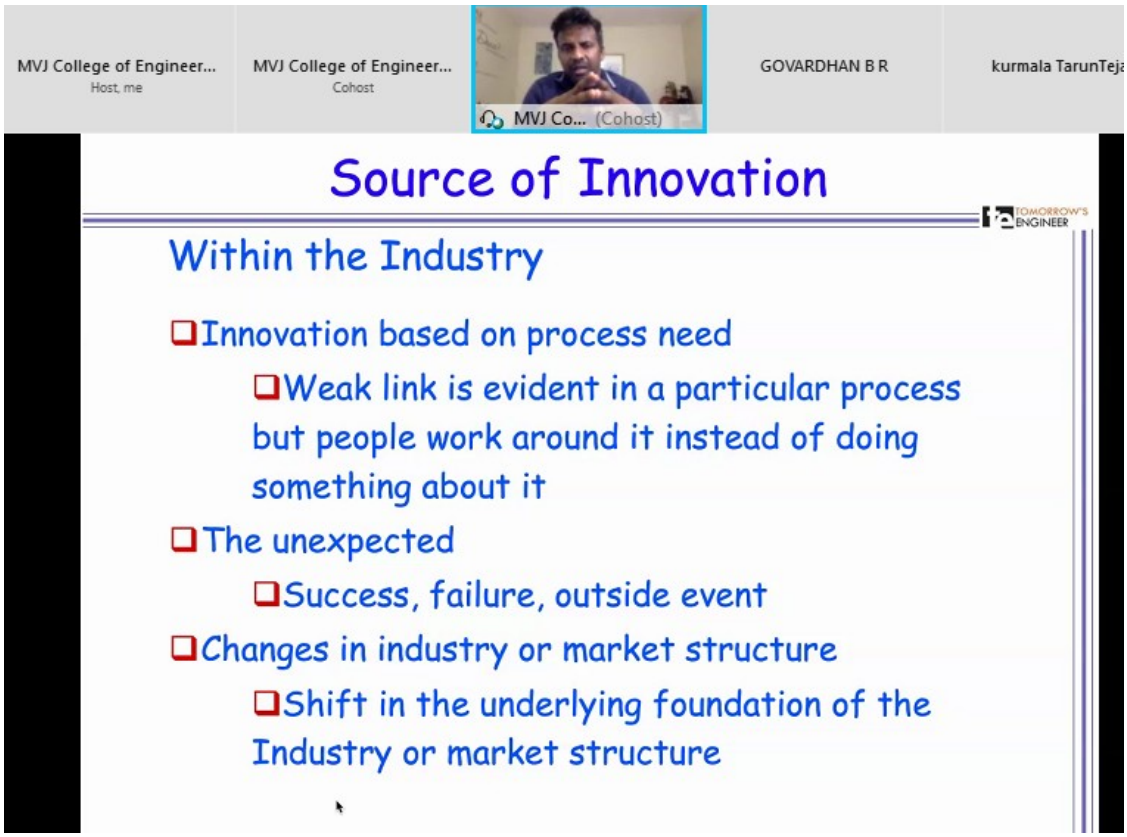
'Write' function – Improvement with new, new technology

TOMORROW'S ENGINEER



Invention (by injective new ways)	Year
Cave/Rock art	40,000 BCE
Clay tablets	4,000 BCE
Papyrus/Palm leaf	3,500 BCE
Paper	200 CE
Printing (Guttenberg)	1450 CE
Pencil	1790 CE
Fountain pen	1830 CE
Ballpoint pen	1888 CE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Source of Innovation
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Within the Industry
Innovation based on process need
Weak link is evident in a particular process but people work around it instead of doing something about it
The unexpected
Success, failure, outside event
Changes in industry or market structure
Shift in the underlying foundation of the Industry or market structure


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Source of Innovation
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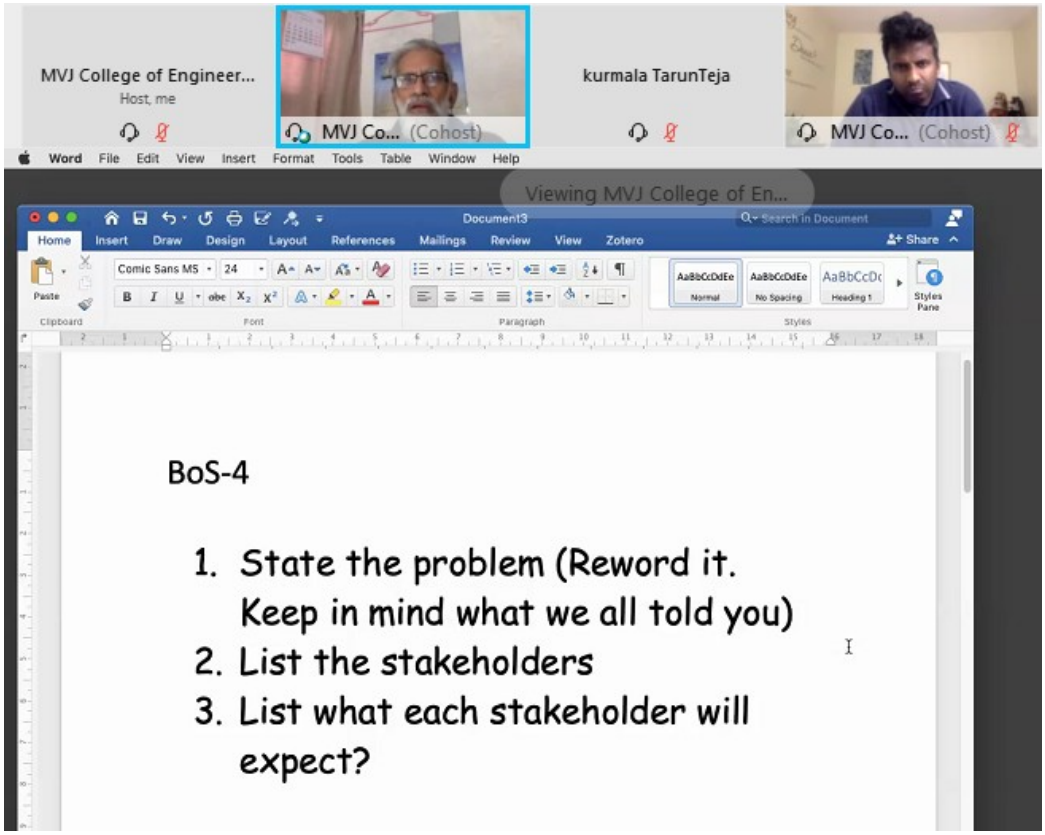
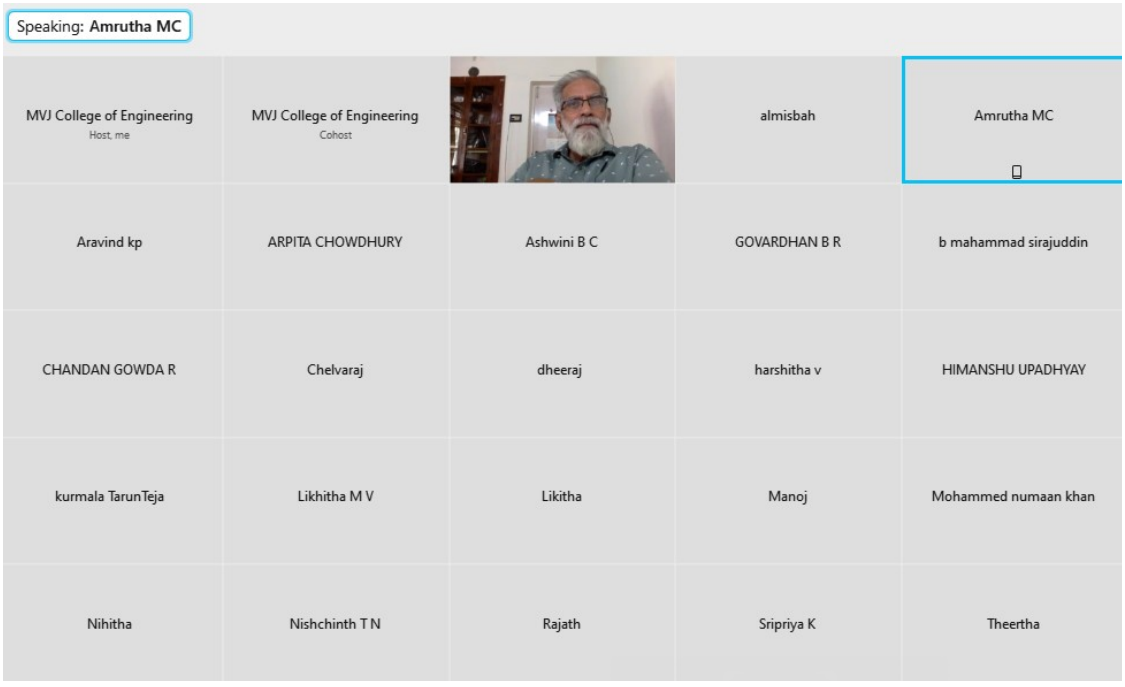
In societal environment
Demographics
Changes in population's size, age, structure, composition, employment, level of education and income, literacy, double income parents, increase in life expectancy
Changes in perception, mood and meaning
Shift in society's general assumptions, attitudes and beliefs
New Knowledge
Advances in scientific and non-scientific knowledge
Big possibility when advances in two different areas can be integrated to form a basis for a completely new product



Day 3 (17.12.2020):

On the third day of the workshop students were asked to formulate a feasible solution for the identified problem statement & also to identify possible stakeholders. Throughout the third day of the workshop, students were mentored by Dr. A S



Shaja & Dr. K Sudhakar.

BoS-4: Step-1 from 'draft problem statement'

Questions | Responses 2

You can explain the problem in details (If you wish to)

Too much of plastic disposed alternative method should be made to control the disposal of plastic & garbage non bio degradable in railways as India being the 2nd largest network in Asia s it plays very important role as a large part of population travells using railways

List some stakeholders. Each stakeholder in a new line. *

Primary stake holder : passengers
Secondary stakeholders : railways
Tertiary stakeholders : government

List what each stakeholder may expect. Give at least one expectation from each stakeholder. Each in a new line. *

Positive & happier atmosphere for passengers with safe environment .
Railways authorities : they will have to worry less about the spreading of diseases among the passengers.
Government : more passengers will contribute to the economy growth of the country

Tell us how you all felt while brainstorming. *

It was great experience to discuss ideas from our team members to get to know different problems.

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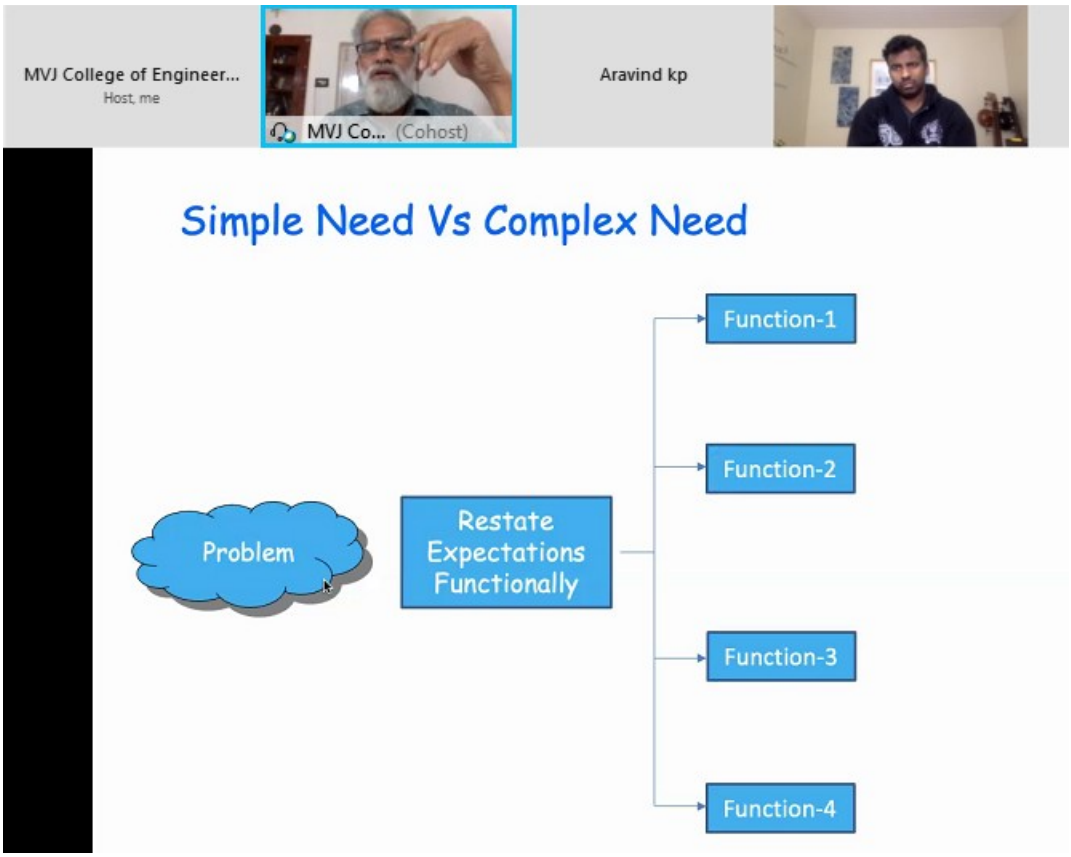
Concept Generation Process

Idea → Product

1. Identify problems
2. Pick a problem that is most promising
   - You have expertise required to solve it
   - You have good understanding of the problem and can gain better understanding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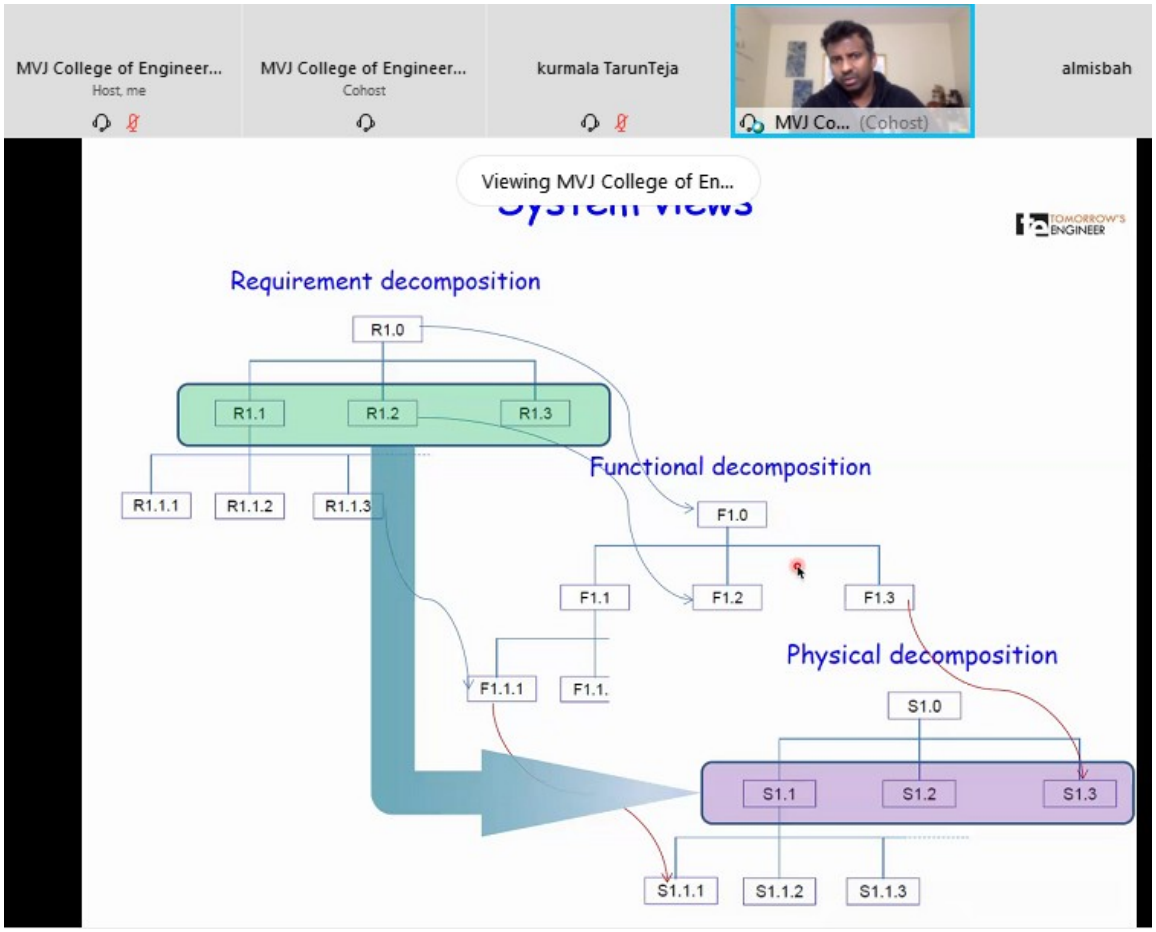
Simple Need Vs Complex Need
Problem
Restate Expectations Functionally
Function-1
Function-2
Function-3
Function-4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Requirement decomposition
R1.0
R1.1
R1.2
R1.3
R1.1.1
R1.1.2
R1.1.3
Functional decomposition
F1.0
F1.1
F1.2
F1.3
F1.1.1
F1.1.
Physical decomposition
S1.0
S1.1
S1.2
S1.3
S1.1.1
S1.1.2
S1.1.3

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System development stages

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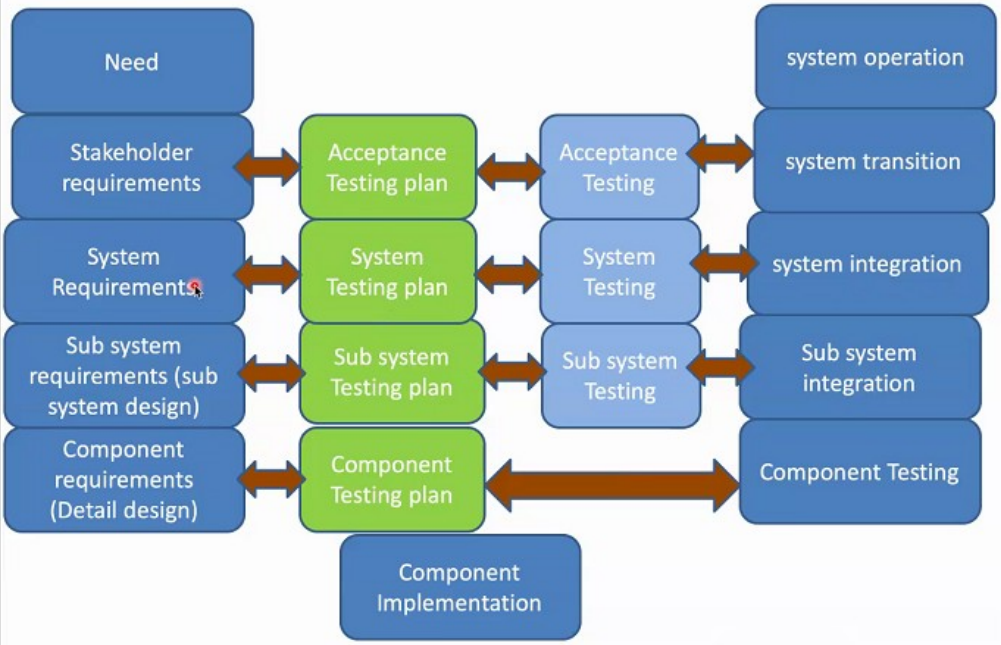

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Example : Need → Pen to write

TOMORROW'S ENGINEER

Student "Need a pen to write"

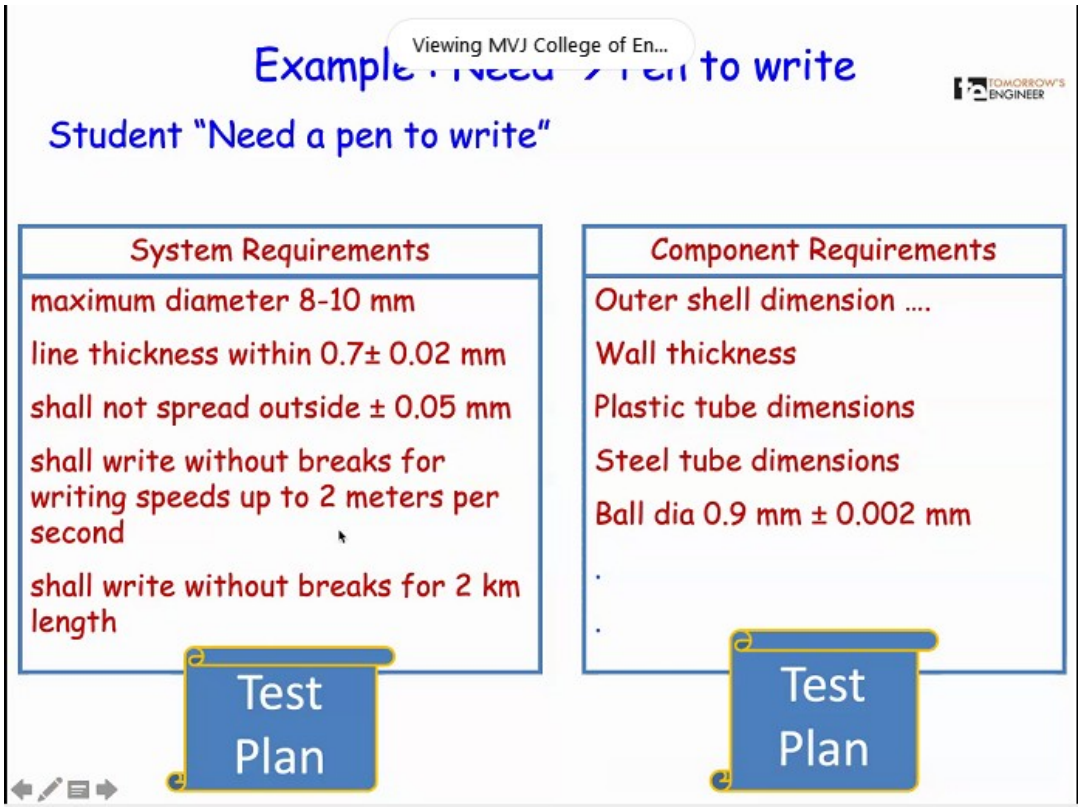
What all shall a user (student) need from a pen

Need
Easy to hold
Consistent line thickness
No smudging
No breaks while writing
Last for at least one notebook

Test Plan

System Requirements
maximum diameter 8-10 mm
line thickness within 0.7± 0.02 mm
shall not spread outside ± 0.05 mm
shall write without breaks for writing speeds up to 2 meters per second
shall write without breaks for 2 km length

Test Plan



The workshop came to an end with a vote of thanks and E-certificates were distributed to all the participants.

Outcome:

The students gained an awareness of the various thinking skills which are required to be applied for improving their solution ideas. They also understood the importance of thinking out-of-the-box, instead of following the traditional approach of solving a problem.

Social Media Link:

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Twitter: https://bit.ly/3mT0ver

Instagram: https://bit.ly/2VK3MRw

LinkedIn: https://bit.ly/2VQZc3G