Report on 3-days Workshop on 'Design thinking, Creative Thinking, Innovation design and Problem-Solving'

Date: 15th December 2021 to 17th December 2021

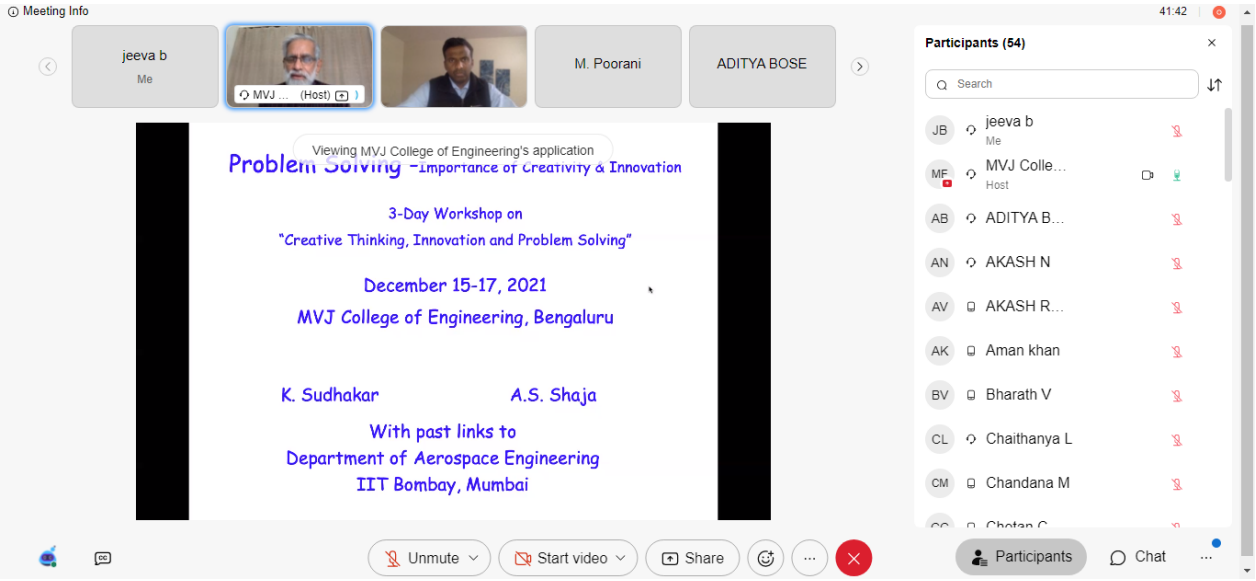
Date of the Event	15.12.2021 to 17.12.2021
Title of the Event	A 3-day Workshop on 'Design thinking, Creative Thinking, Innovation design and Problem-Solving'
Organized by	Tomorrow's Engineers Club, MVJCE
Name of the Coordinator	Dr. Poorani M, Asst. Professor, Dept. of DS (ISE) Prof. Jeeva B, Asst. Professor, Dept. of ECE
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

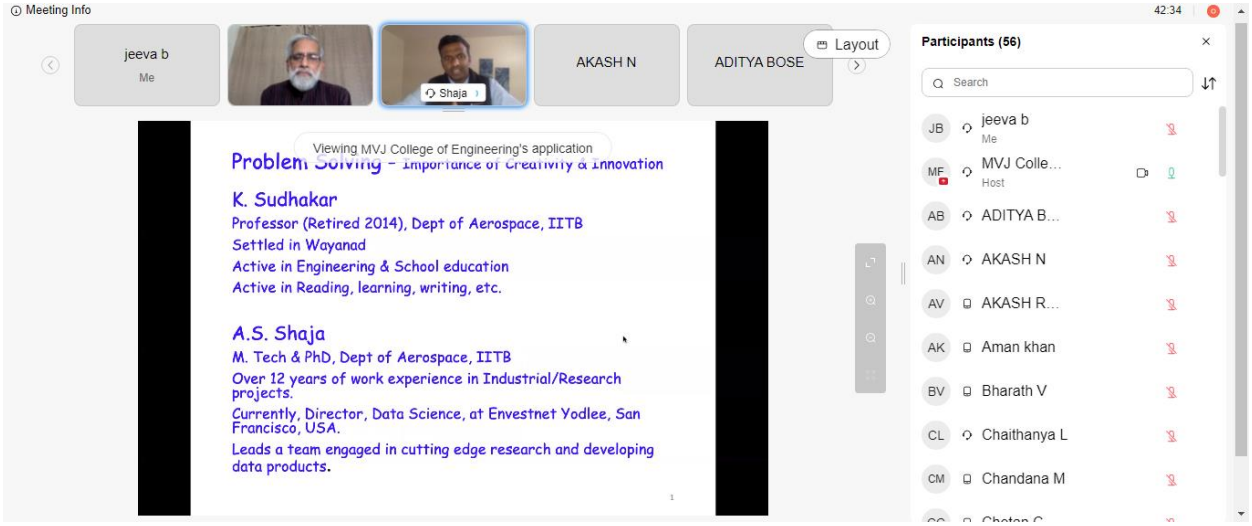
Considering the fact that societal problems are one of the major concerns for future Engineers, the 'Tomorrow's Engineers Club' of MVJCE conducted a 3-day Workshop on 'Design thinking, Creative Thinking, Innovation design and Problem-Solving', from 15.12.2021 to 17.12.2021, in a blended mode. The main objective of this Workshop was to provide a platform for students from all 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 we face, every day. The students were divided into six interdisciplinary groups, each group identified a societal problem and presented an innovative solution for that problem.

Day 1 (15.12.2021)

The Workshop was inaugurated by Dr. P Mahabaleswarappa, Principal, MVJCE. In his welcome address, the Principal said that while creativity is the ability to produce new and unique ideas, innovation is the execution of thosecreative ideas.

The Resource Speaker for the 1st day of the Workshop was Dr. K Sudhakar, Professor (Retd.), Department of Aerospace Engineering, IIT Bombay. He discussed about the importance of creativity and innovation, in problem-solving.

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42:34
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Shaja
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ADITYA BOSE
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Viewing MVJ College of Engineering's application
Problem Solving – Importance of Creativity & Innovation
K. Sudhakar
Professor (Retired 2014), Dept of Aerospace, IITB
Settled in Wayanad
Active in Engineering & School education
Active in Reading, learning, writing, etc.
A.S. Shaja
M. Tech & PhD, Dept of Aerospace, IITB
Over 12 years of work experience in Industrial/Research projects.
Currently, Director, Data Science, at Envestnet Yodlee, San Francisco, USA.
Leads a team engaged in cutting edge research and developing data products.
Participants (56)
Search
JB jeeva b Me
MF MVJ Colle... Host
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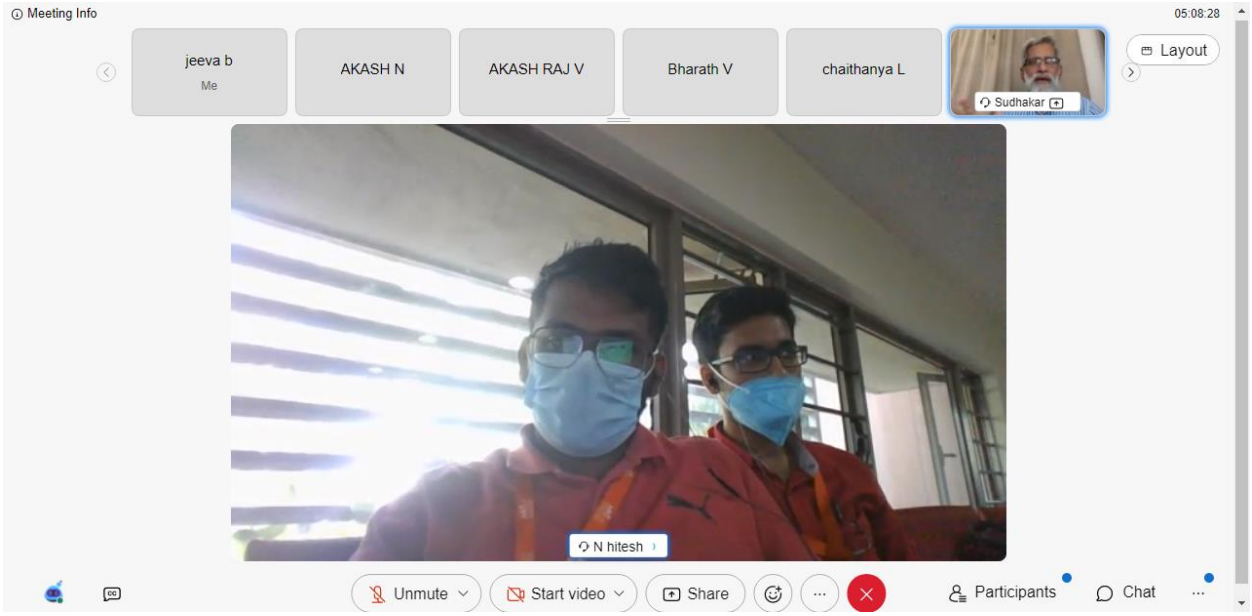
AV AKASH R...
AK Aman khan
BV Bharath V
CL Chaithanya L
CM Chandana M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Bharath V
chaithanya L
Sudhakar
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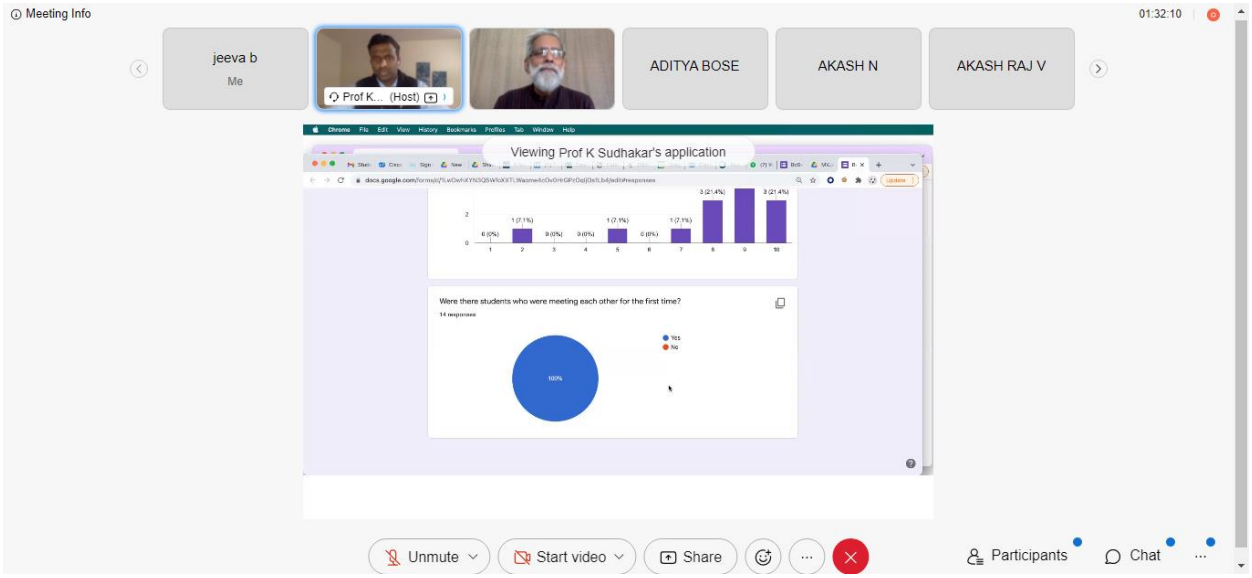
Share
Participants
Chat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Prof K... (Host)
ADITYA BOSE
AKASH N
AKASH RAJ V
Viewing Prof K Sudhakar's application
Were there students who were meeting each other for the first time?
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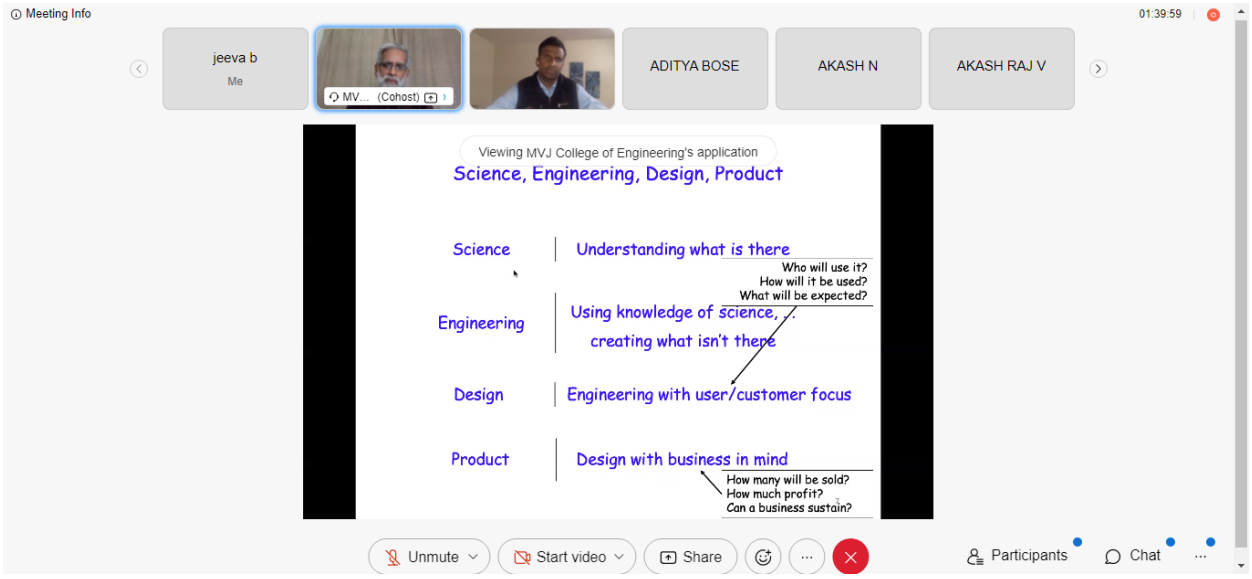
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jeeva b
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MV... (Cohost)
ADITYA BOSE
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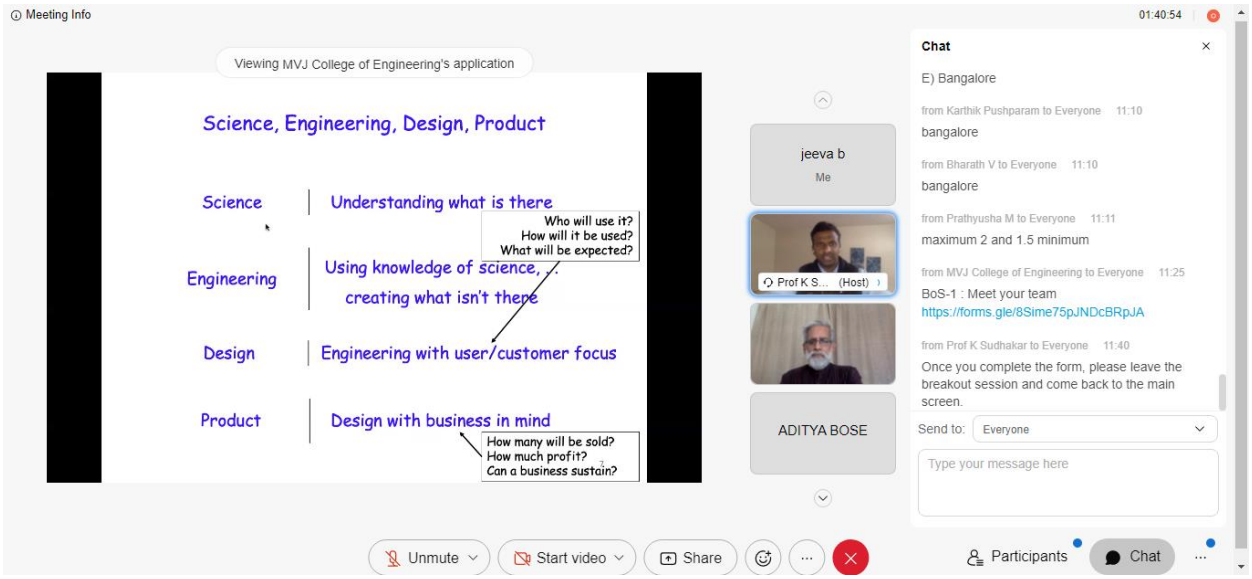
AKASH RAJ V
Viewing MVJ College of Engineering's application
Science, Engineering, Design, Product
Science
Understanding what is there
Who will use it?
How will it be used?
What will be expected?
Engineering
Using knowledge of science, ..
creating what isn't there
Design
Engineering with user/customer focus
Product
Design with business in mind
How many will be sold?
How much profit?
Can a business sustain?
Unmute
Start video
Share
Participants
Chat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Science, Engineering, Design, Product
Science
Understanding what is there
Who will use it?
How will it be used?
What will be expected?
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Using knowledge of science, ..
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Design
Engineering with user/customer focus
Product
Design with business in mind
How many will be sold?
How much profit?
Can a business sustain?
jeeva b
Me
Prof K S... (Host)
ADITYA BOSE
Chat
E) Bangalore
from Karthik Pushparam to Everyone 11:10
bangalore
from Bharath V to Everyone 11:10
bangalore
from Prathyusha M to Everyone 11:11
maximum 2 and 1.5 minimum
from MVJ College of Engineering to Everyone 11:25
BoS-1 : Meet your team
https://forms.gle/8Sime75pJNDcBRpJA
from Prof K Sudhakar to Everyone 11:40
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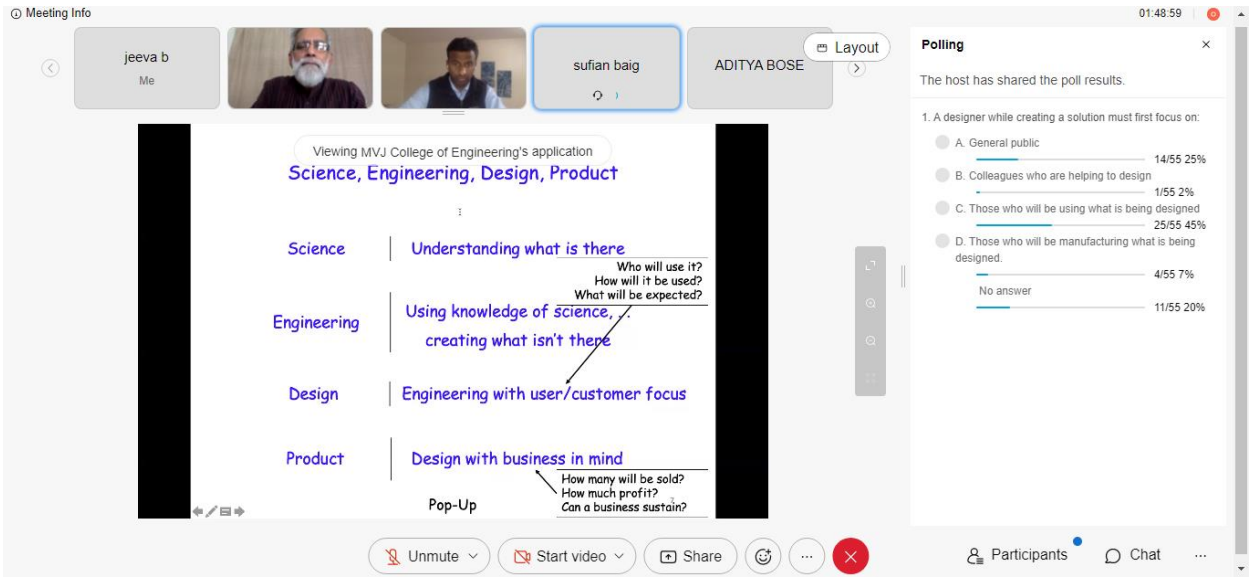
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Layout
Viewing MVJ College of Engineering's application
Science, Engineering, Design, Product
Science
Understanding what is there
Who will use it?
How will it be used?
What will be expected?
Engineering
Using knowledge of science, ..
creating what isn't there
Design
Engineering with user/customer focus
Product
Design with business in mind
How many will be sold?
How much profit?
Can a business sustain?
Pop-Up
Polling
The host has shared the poll results.
1. A designer while creating a solution must first focus on:
A. General public
14/55 25%
B. Colleagues who are helping to design
1/55 2%
C. Those who will be using what is being designed
25/55 45%
D. Those who will be manufacturing what is being designed.
4/55 7%
No answer
11/55 20%
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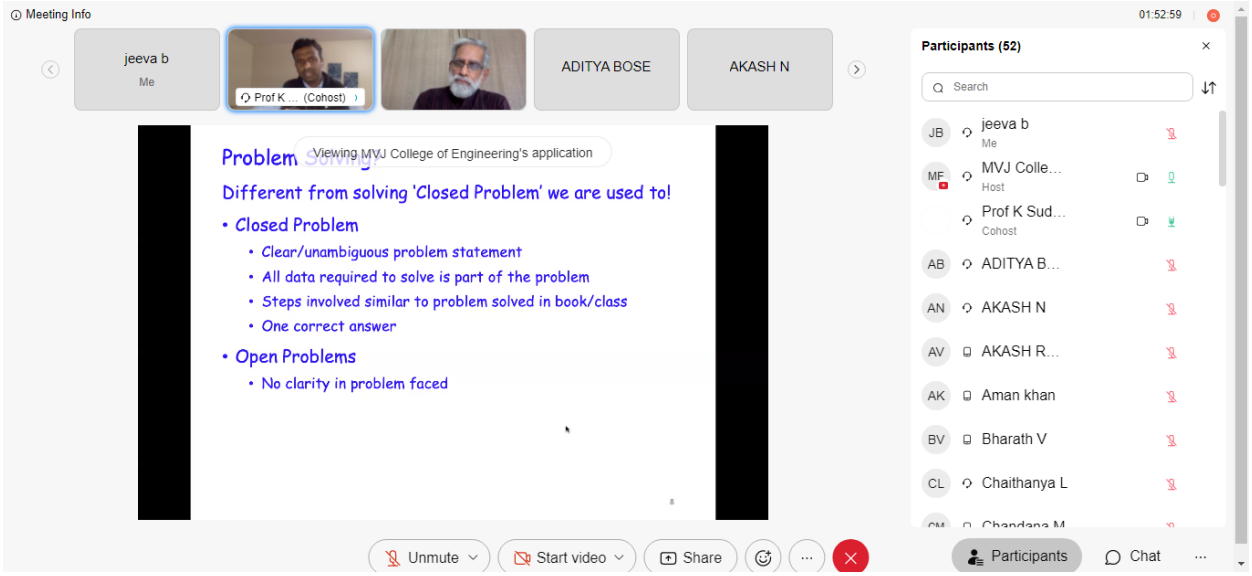
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jeeva b
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Prof K ... (Cohost)
ADITYA BOSE
AKASH N
Viewing MVJ College of Engineering's application
Problem Solving
Different from solving 'Closed Problem' we are used to!
• Closed Problem
• Clear/unambiguous 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
• No clarity in problem faced
Participants (52)
Search
JB jeeva b Me
MF MVJ Colle... Host
Prof K Sud... Cohost
AB ADITYA B...
AN AKASH N
AV AKASH R...
AK Aman khan
BV Bharath V
CL Chaithanya L
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Participants
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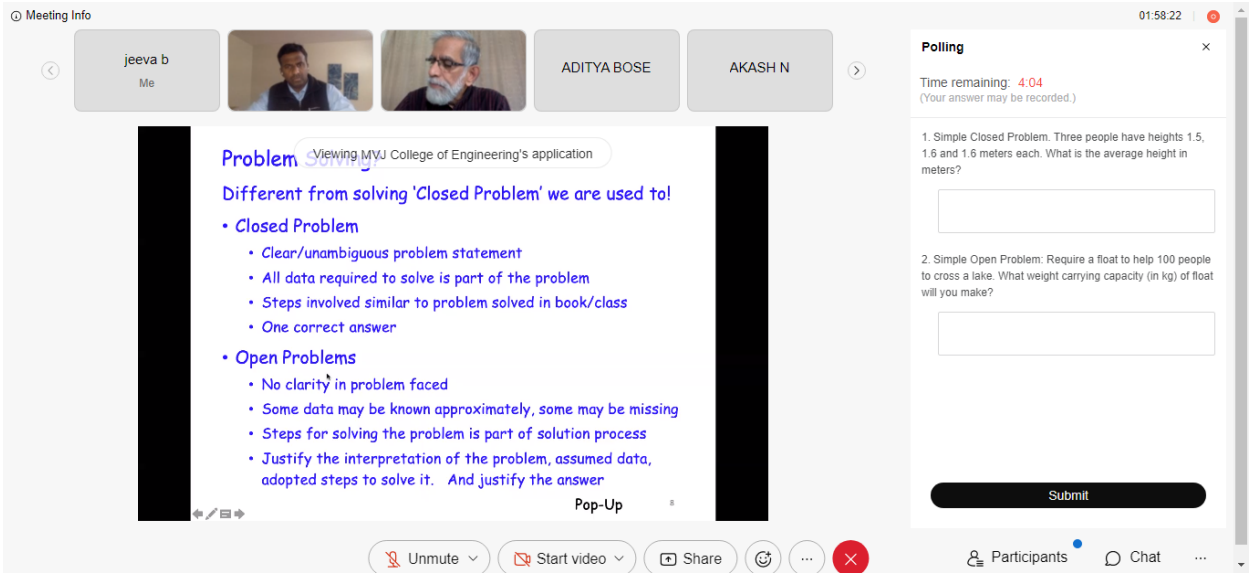
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jeeva b
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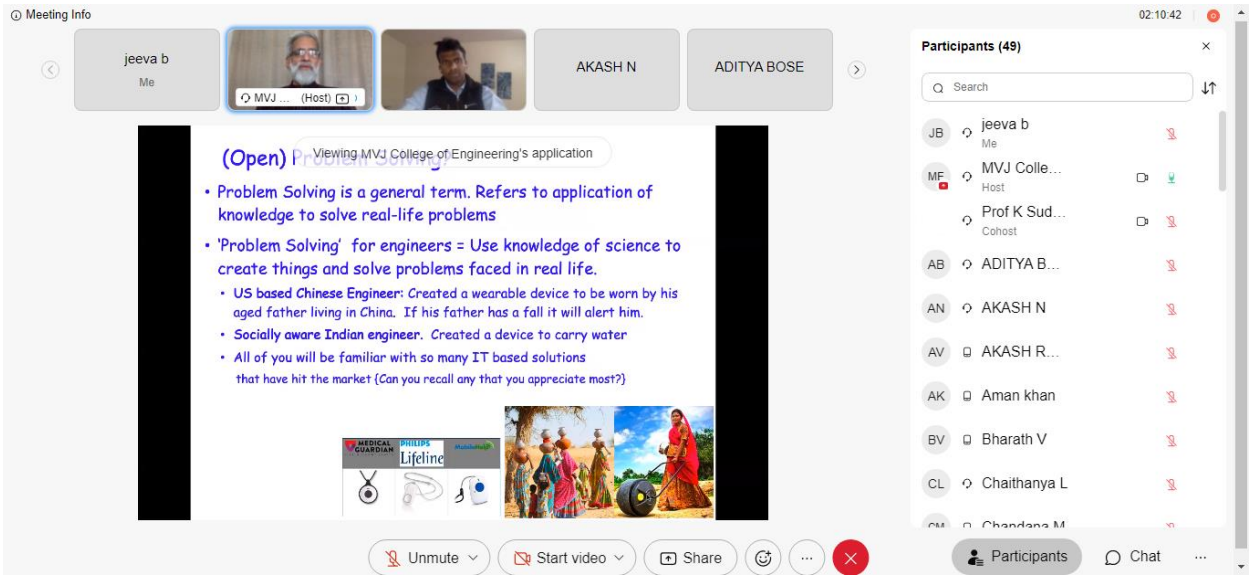
ADITYA BOSE
AKASH N
Viewing MVJ College of Engineering's application
Problem Solving
Different from solving 'Closed Problem' we are used to!
• Closed Problem
• Clear/unambiguous problem statement
• All data required to solve is part of the problem
• Steps involved similar to problem solved in book/class
• One correct answer
• Open Problems
• No clarity in problem faced
• Some data may be known approximately, some may be missing
• Steps for solving the problem is part of solution process
• Justify the interpretation of the problem, assumed data, adopted steps to solve it. And justify the answer
Pop-Up
Polling
Time remaining: 4:04
(Your answer may be recorded.)
1. Simple Closed Problem. Three people have heights 1.5, 1.6 and 1.6 meters each. What is the average height in meters?
2. 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?
Submit
Unmute
Start video
Share
Participants
Chat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jeeva b
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MVJ.... (Host)
AKASH N
ADITYA BOSE
Viewing MVJ College of Engineering's application
(Open) Problem Solving
• Problem Solving is a general term. Refers to application of knowledge to solve real-life problems
• 'Problem Solving' for engineers = Use knowledge of science to create things and solve problems faced in real life.
• US based Chinese Engineer: Created a wearable device to be worn by his aged father living in China. If his father has a fall it will alert him.
• Socially aware Indian engineer. Created a device to carry water
• All of you will be familiar with so many IT based solutions that have hit the market (Can you recall any that you appreciate most?)
MEDICAL GUARDIAN
PHILIPS
Lifeline
Participants (49)
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JB jeeva b Me
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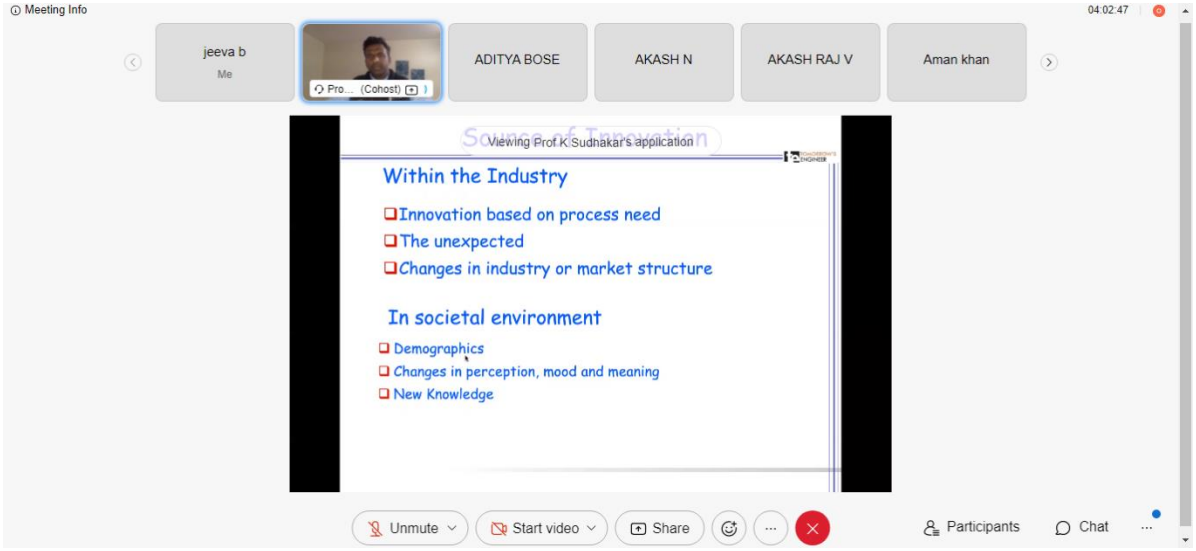
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Pro... (Cohost)
ADITYA BOSE
AKASH N
AKASH RAJ V
Aman khan
Viewing Prof K Sudhakar's application
Within the Industry
Innovation based on process need
The unexpected
Changes in industry or market structure
In societal environment
Demographics
Changes in perception, mood and meaning
New Knowledge
Unmute
Start video
Share
Participants
Chat


Meeting Info
04:14:10
jeeva b
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Pro... (Cohost)
ADITYA BOSE
AKASH N
N hitesh
AKASH RAJ V
Viewing Prof K Sudhakar's application
Old Ends
New Ends
Old Means
Commodity
CDs
Product Improvement
AudioBooks
New Means
Process Improvement
Polymers/Layers
Breakthrough Innovation
Unmute
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Participants
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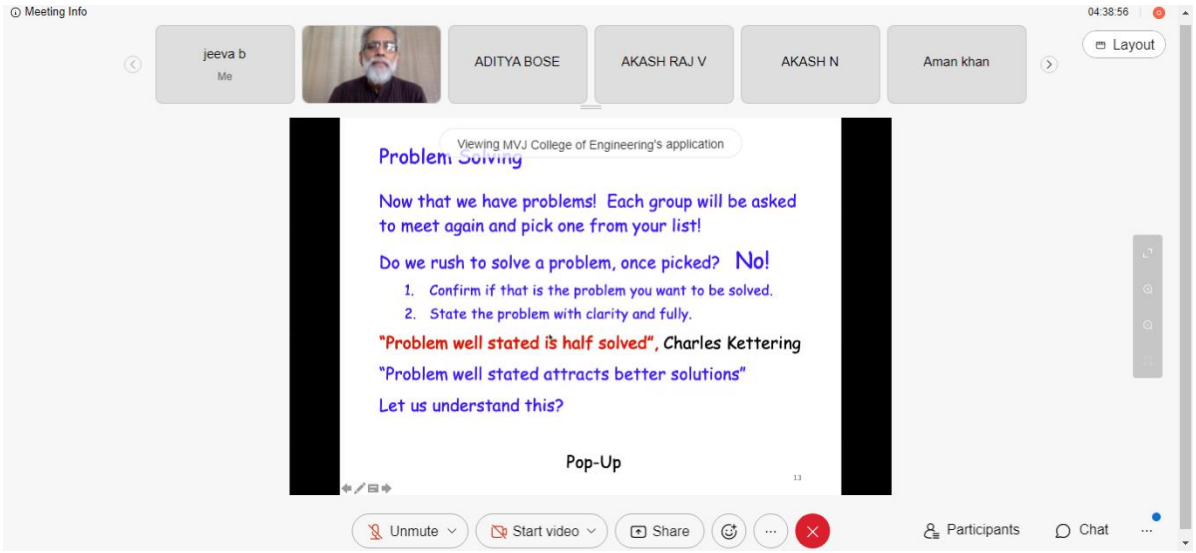
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ADITYA BOSE
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AKASH N
Aman khan
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Viewing MVJ College of Engineering's application
Problem Solving
Now that we have problems! Each group will be asked to meet again and pick one from your list!
Do we rush to solve a problem, once picked? No!
1. Confirm if that is the problem you want to be solved.
2. State the problem with clarity and fully.
"Problem well stated is half solved", Charles Kettering
"Problem well stated attracts better solutions"
Let us understand this?
Pop-Up
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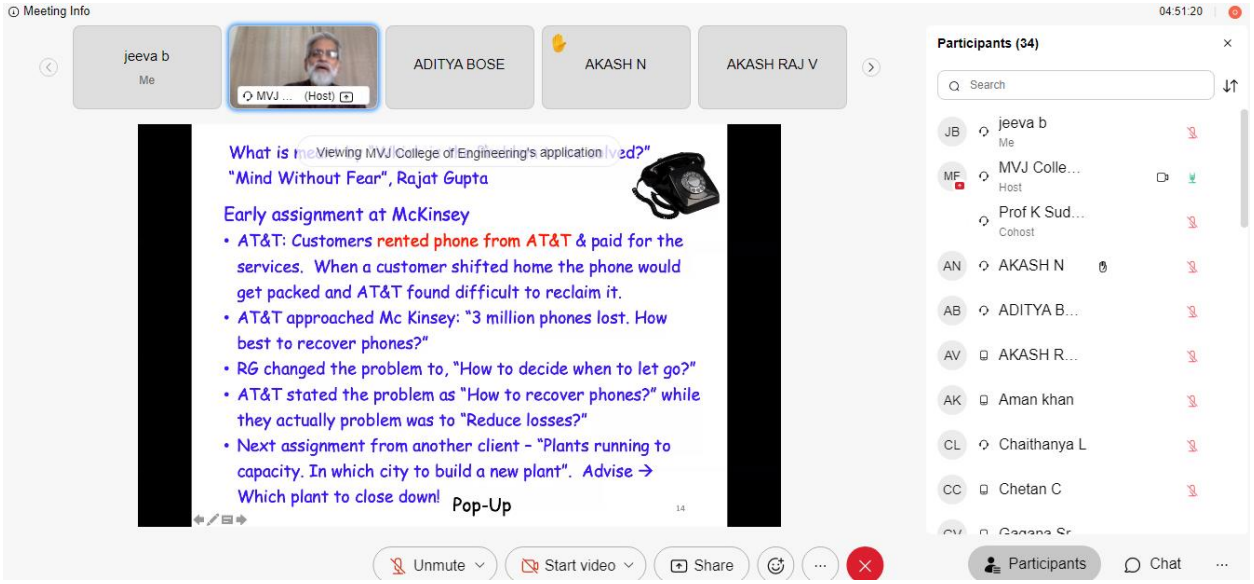
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MVJ ... (Host)
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AKASH RAJ V
Participants (34)
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Prof K Sud... Cohost
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AV AKASH R...
AK Aman khan
CL Chaithanya L
CC Chetan C
Viewing MVJ College of Engineering's application
"Mind Without Fear", Rajat Gupta
Early assignment at McKinsey
• AT&T: Customers rented phone from AT&T & paid for the services. When a customer shifted home the phone would get packed and AT&T found difficult to reclaim it.
• AT&T approached Mc Kinsey: "3 million phones lost. How best to recover phones?"
• RG changed the problem to, "How to decide when to let go?"
• AT&T stated the problem as "How to recover phones?" while they actually problem was to "Reduce losses?"
• Next assignment from another client – "Plants running to capacity. In which city to build a new plant". Advise → Which plant to close down!
Pop-Up
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Start video
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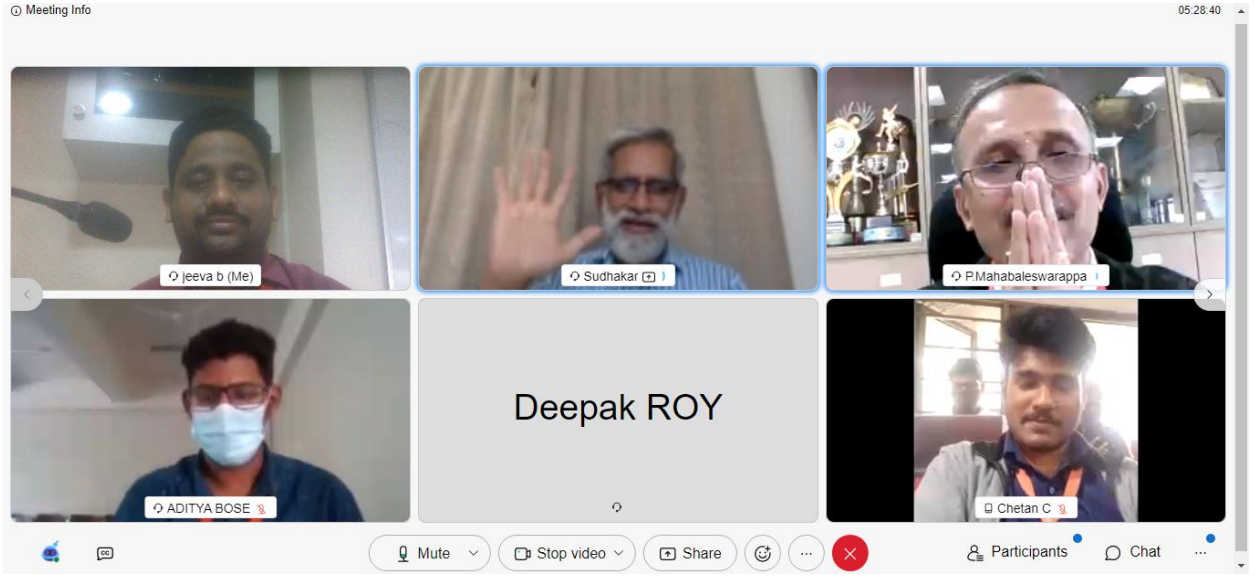
Participants
Chat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Sudhakar
P.Mahabaleswarappa
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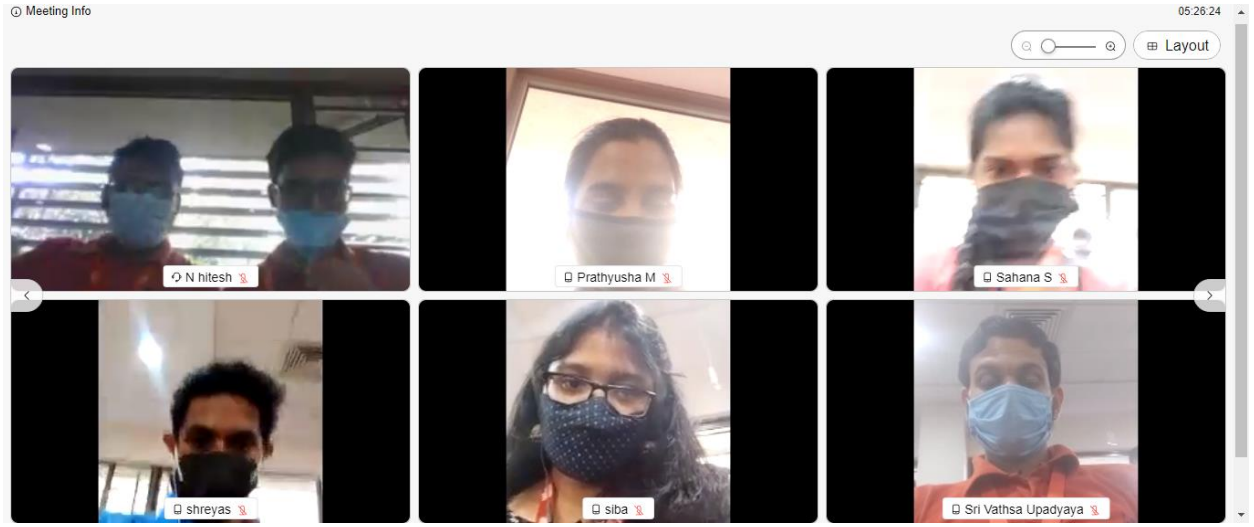
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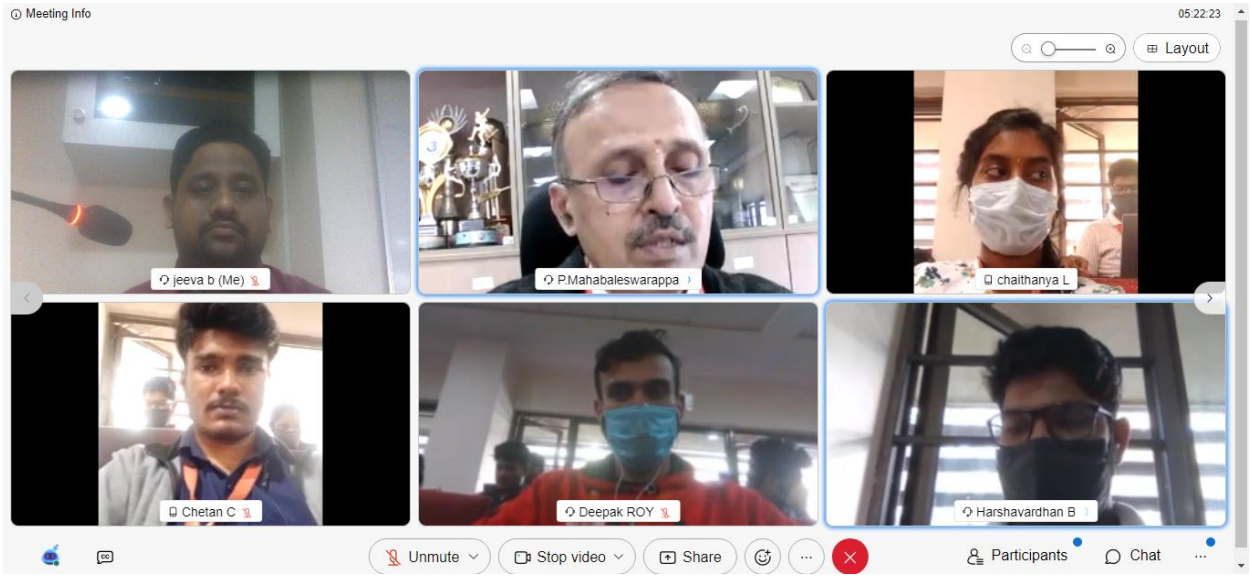
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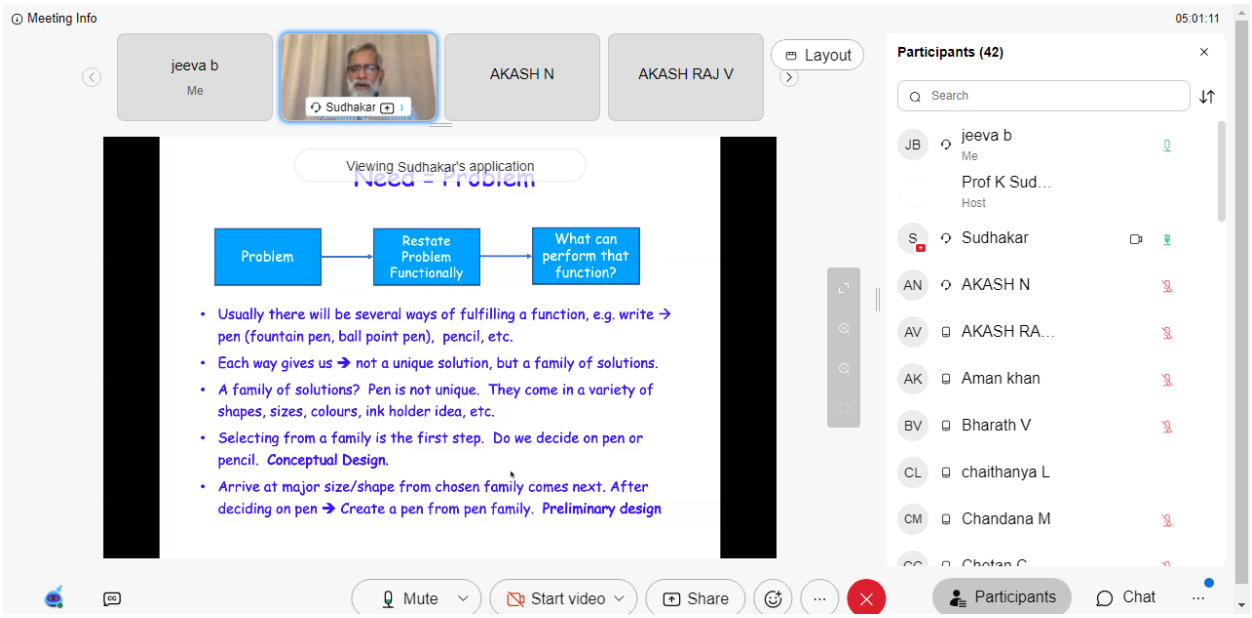
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jeeva b
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Sudhakar
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AKASH RAJ V
Layout
Viewing Sudhakar's application
Problem
Restate Problem Functionally
What can perform that function?
Usually there will be several ways of fulfilling a function, e.g. write → pen (fountain pen, ball point pen), pencil, etc.
Each way gives us → not a unique solution, but a family of solutions.
A family of solutions? Pen is not unique. They come in a variety of shapes, sizes, colours, ink holder idea, etc.
Selecting from a family is the first step. Do we decide on pen or pencil. Conceptual Design.
Arrive at major size/shape from chosen family comes next. After deciding on pen → Create a pen from pen family. Preliminary design
Participants (42)
Search
JB jeeva b Me
Prof K Sud... Host
S Sudhakar
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AV AKASH RA...
AK Aman khan
BV Bharath V
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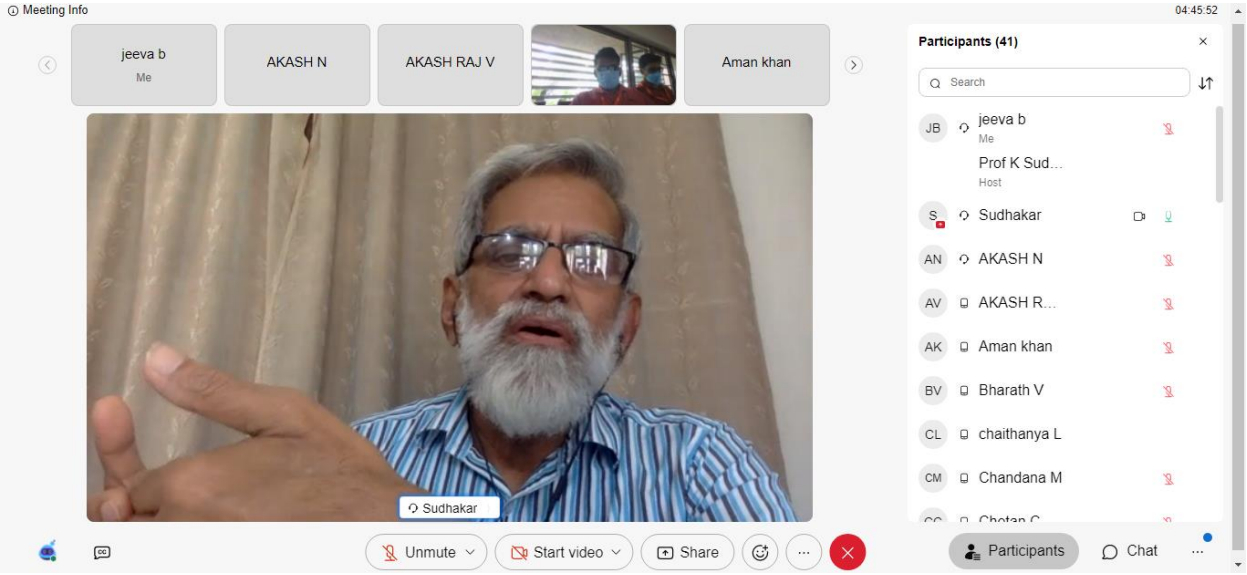
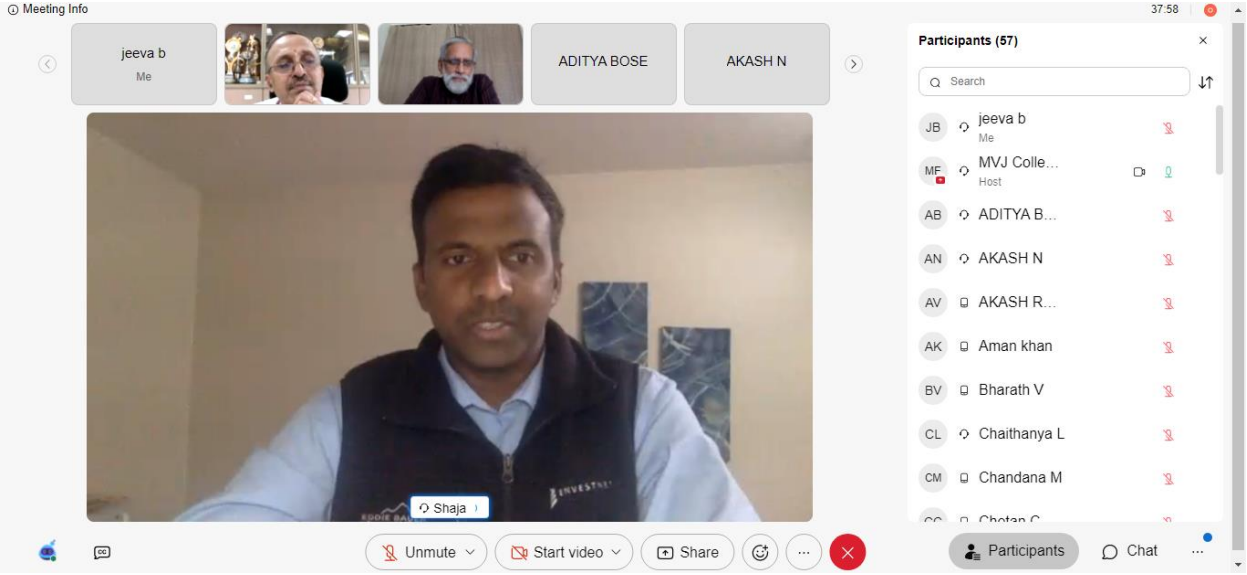




After the session by Dr. K Sudhakar, students were allotted a separate meeting room for discussion among their group members and listing out multiple problem statements. Following this, Dr. K Sudhakar explained to the participants about refining the problem statements and finalizing a single problem statement.

List of Finalized Problem Statements:

Group 1: E-Waste Management

Group 2: No Tax Energy

Group 3: Innovative Pavement

Group 4: Drones in Modern Agriculture, in India

Group 5: Underground Wireless Current Supply

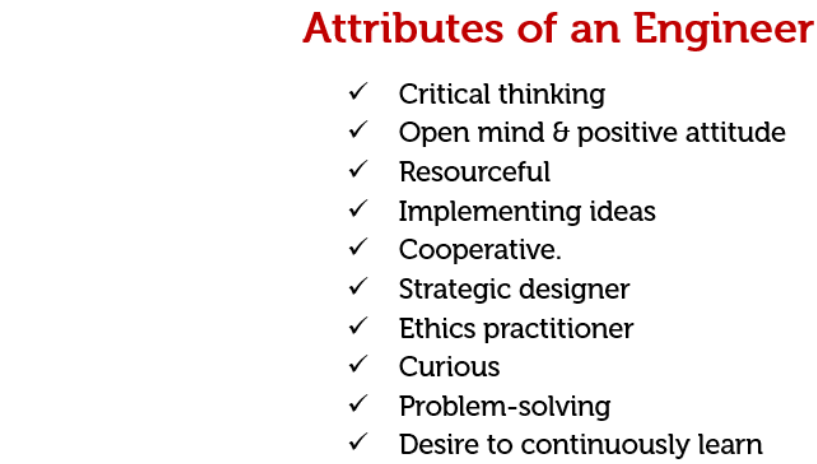
Group 6: Angio Prognosticator

Sl. No.	Project Title	Students Names	USN	Semester	Dept.
1	E-Waste Management	Sahana S	1MJ19CV039	3	CIVIL
		Deepak Kumar Roy	1MJ20CS056	3	CSE
		Sumanth H H	1MJ20CV402	5	CIVIL
		Jayanth A	1MJ19EE010	5	EEE
		P V Himashree	1MJ20EE015	3	EEE
		Anupam Kumar	1MJ20CS024	3	CSE
		Moksha KR	1MJ20EE012	3	EEE
2	No Tax energy	Chaithanya L	1MJ20CD045	3	Data science
		Chetan C	1MJ19EE006	5	EEE
		Irene Sneha Frank	1MJ19AS015	5	Aerospace Engineering
		Anotniya Leena Aarthi G	1MJ19AS006	5	
3	Innovative Pavement	Akash Raj V	1MJ20CV002	3	CIVIL
		Kannan M	1MJ19AE051	5	Aeronautical Engineering
		K R Shyam	1MJ19AE050		
		U Pavan Kumar	1MJ20CD041	3	Data science
		Gaganashree	1MJ20CD010		
		Sathish P	1MJ20CD031		
		Akash N	1MJ19CH001	5	Chemical Engineering
		Neha A K	1MJ20AS020	3	Aerospace Engineering
		Mohammed Mujeebur Rahman R	1MJ20AE401	5	
		Sathya B	1MJ19AE085	5	Aeronautical Engineering
4	Drones in Modern	N Hitesh	1MJ20AE042	3	Chemical

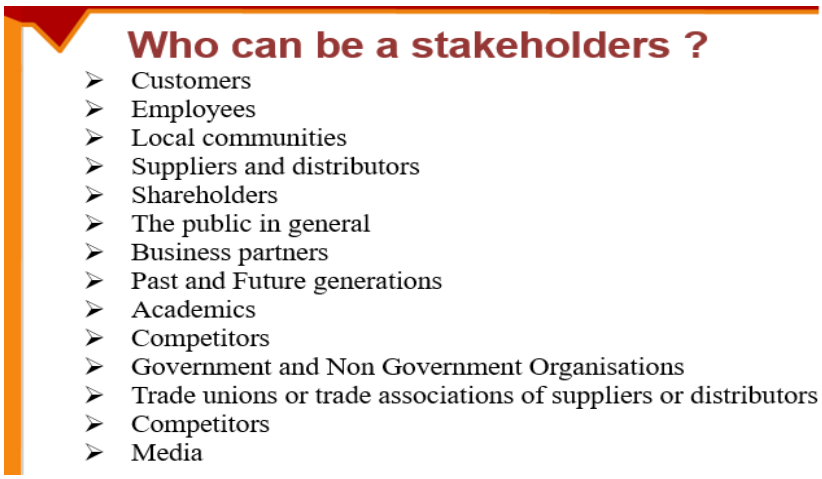
	Agriculture, in India				Engineering
		Mohammed Sarfaraz Ahmed	1MJ20CH013		
		Harshavardhan B	1MJ20CS080	3	CSE
		M Prathyusha	1MJ19EE023	5	EEE
		Guru Prasad Panigrahi	1MJ20EC040	3	ECE
5	Underground Wireless Current Supply	Varshitha C	1MJ19CH028	5	Chemical Engineering
		Karthik	1MJ20CH012	3	
		Varun Rajshekar Malagi	1MJ20AE074	3	Aeronautical Engineering
		Sanjaikumar M	1MJ19CV041	5	Civil Engineering
		Chandana M	1MJ20CV006	3	
		Manoj Kumar A	1MJ19CV023	5	
6	Angio Prognosticator	Prema Gowda	1MJ19CH016	5	Chemical Engineering
		Thasleem Mulla	1MJ20CS129	3	CSE
		P Aditya Bose	1MJ20AS024	3	Aerospace Engineering
		Srivathsa Upadyaya	1MJ19IS094	5	ISE
		Utkarsh	1MJ20AI047	3	AI / ML
		Bharath V	1MJ20CV005	3	CIVIL

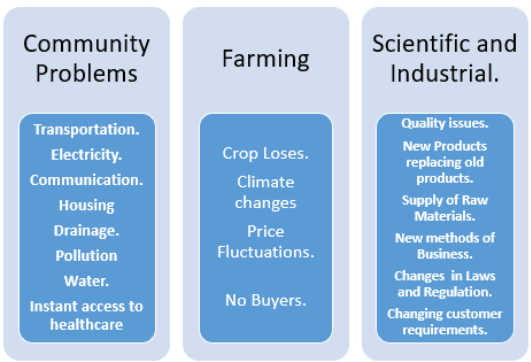
Day 2 (16.12.2021):

The mentors for the 2nd day of the Workshop were Prof. Muralidhar, ASP, CE and Prof. Jeeva, AP, ECE. They spoke to the students on what engineering is, the attributes of an engineer and the usefulness of brainstorming in identifying the issues around us.



Prof. Jeeva, AP, ECE, explained about the importance of stake holders in problem-solving.





Brainstorming Method

- Brainstorming is a group creativity technique to find a conclusion for a specific problem by gathering a list of ideas spontaneously contributed by its members.

General Rules

- Go for quantity
- Withhold criticism
- Welcome wild ideas
- Combine and improve ideas

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Engineering A Better Tomorrow
An Autonomous Institute

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Who are potential stakeholders?

Primary stakeholders:

- Direct beneficiaries and direct concerned person (end users, farmers, urban poor, etc.)

Secondary stakeholders:

- Intermediaries in the process of delivering aid to primary stakeholders(e.g., professionals, advisers, practitioners, consultants, experts, governmental, NGO and private sector organizations etc.)

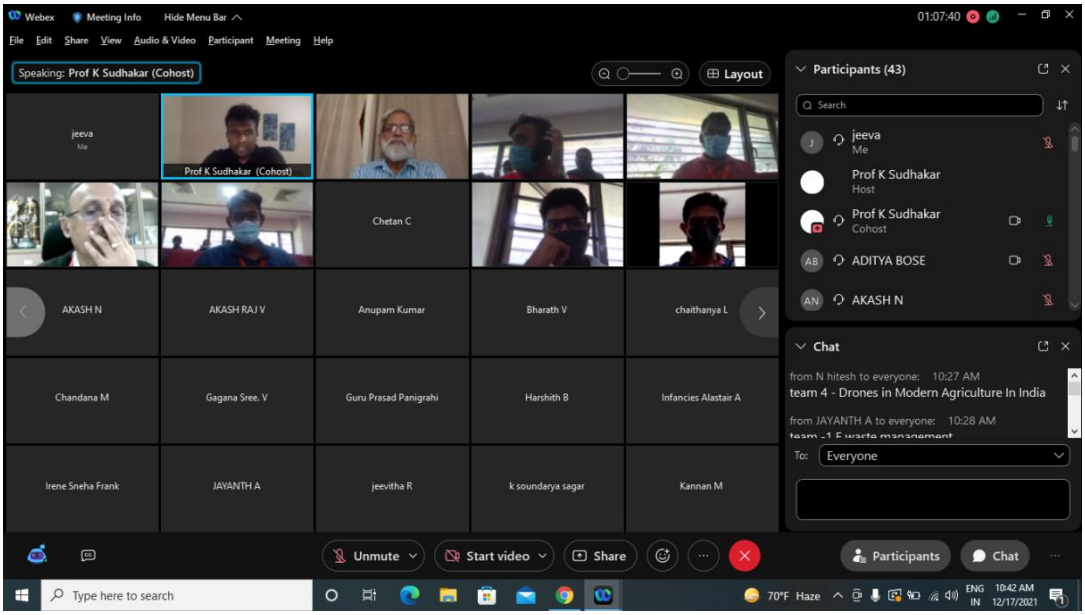
Key stakeholders:

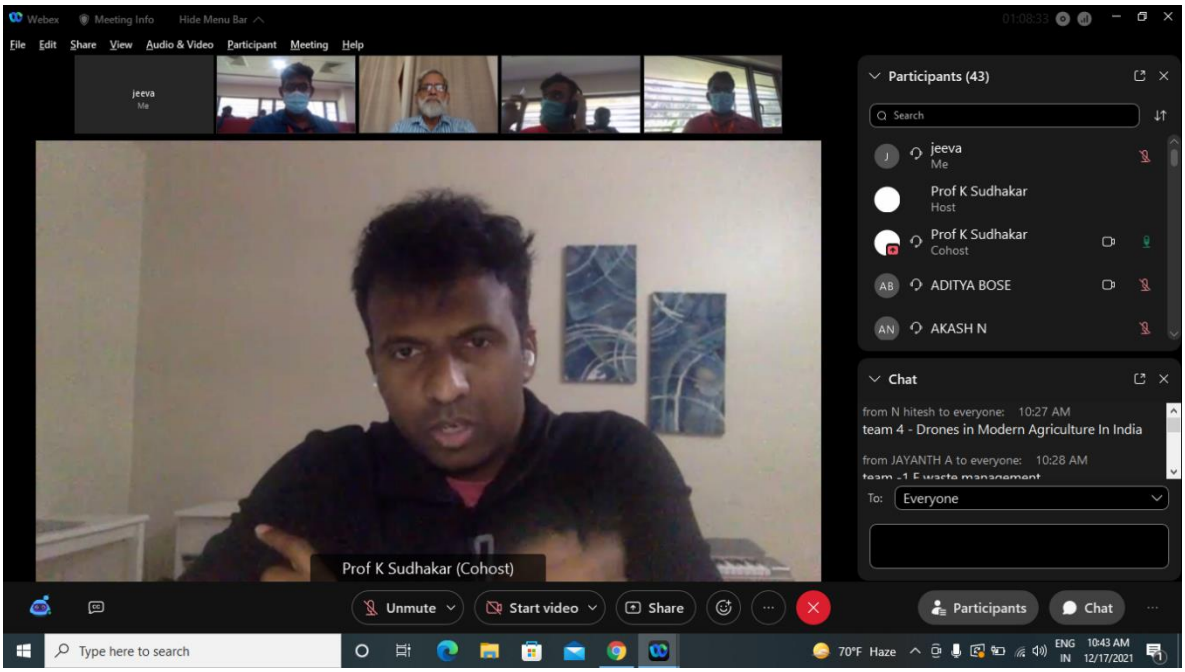
- policy makers (politicians, senior civil servants, district level bodies, governmental bodies, etc)

Following the fore-noon session, the student teams presented solutions and identification of stake holders. The session was interactive and students were able to come up with many innovative solutions for societal problems.

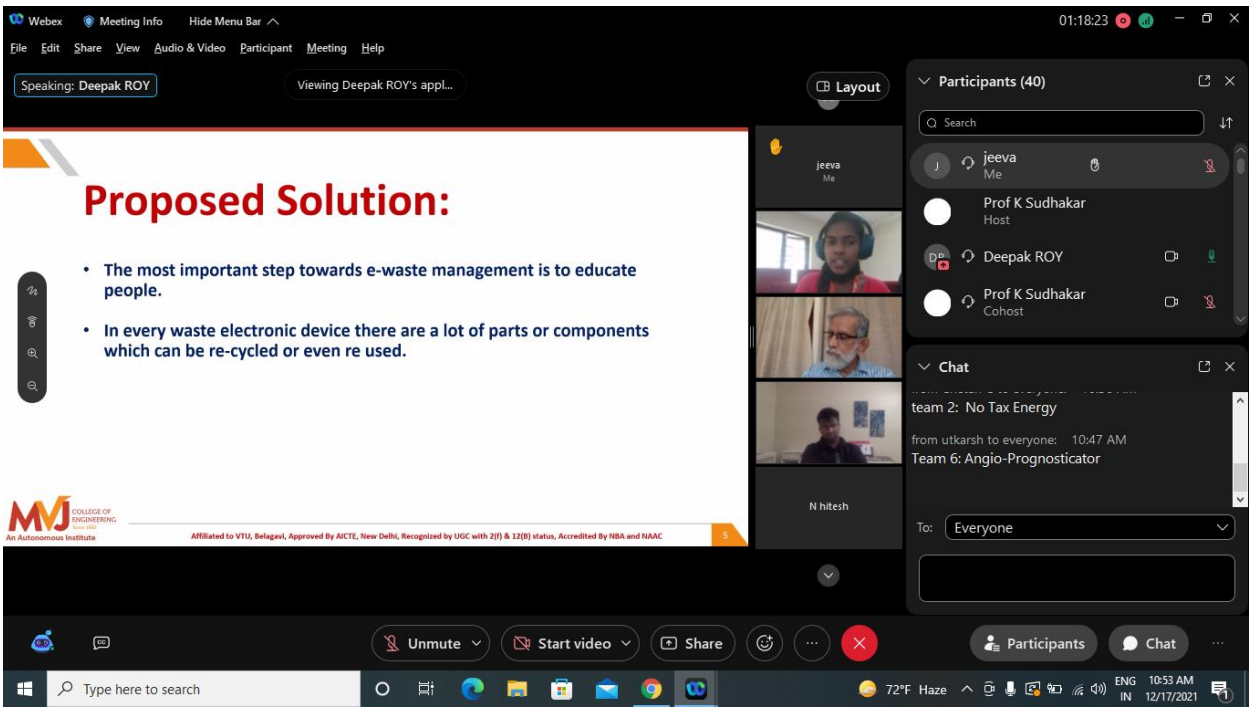
Day 3 (17.12.2020):

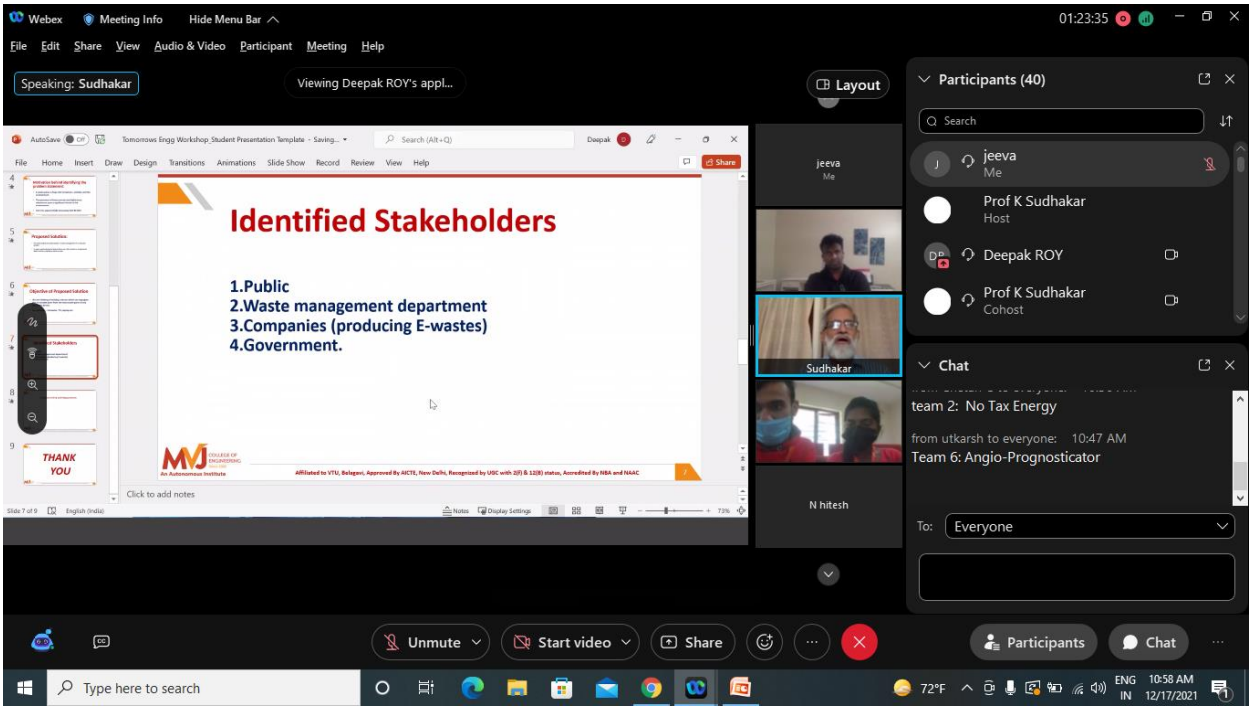
On the third day of the Workshop, during the forenoon, the students were mentored by Dr. A S Shaja and Dr. K Sudhakar. They explained about how to set the objective, the action plan to convert the proposed idea into implementation, and finally to come up with a market-ready product.

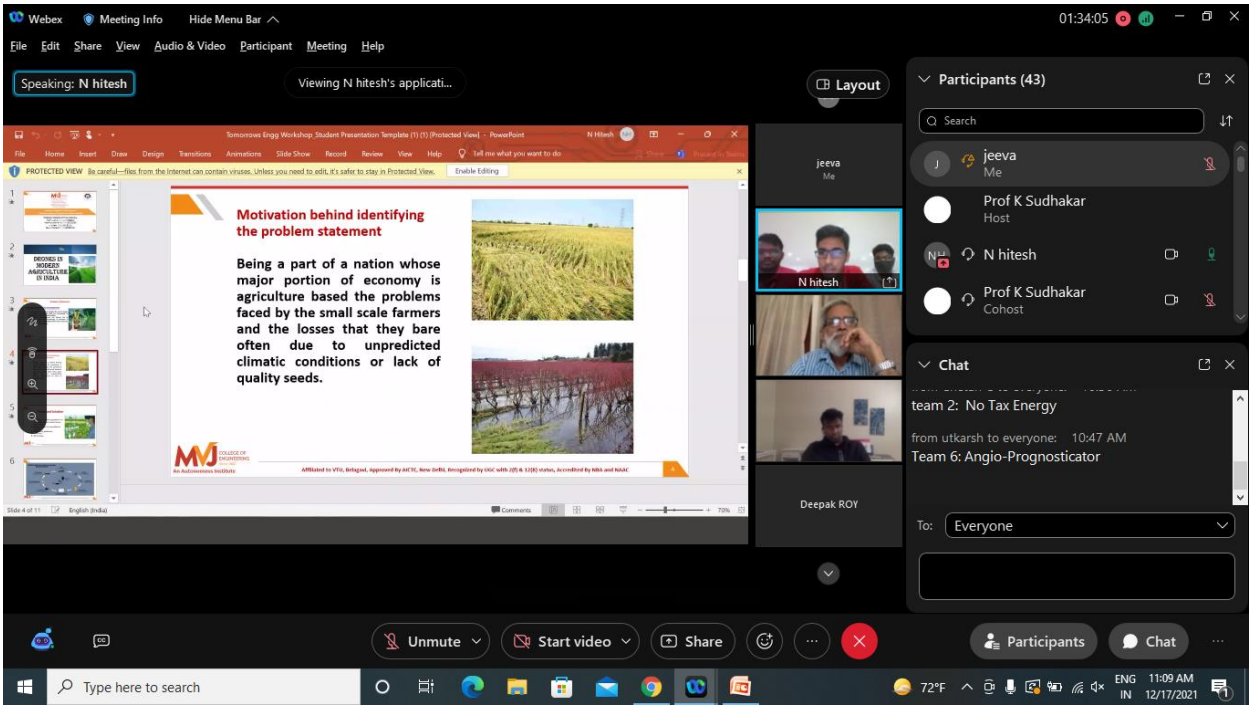




In the afternoon session, the students presented their problem statement along with the solution, and the Resource Persons offered their suggestions to improve on the students' ideas.




Webex
Meeting Info
Hide Menu Bar
01:23:35
File Edit Share View Audio & Video Participant Meeting Help
Speaking: Sudhakar
Viewing Deepak ROY's appl...
Layout
Identified Stakeholders
1.Public
2.Waste management department
3.Companies (producing E-wastes)
4.Government.
THANK YOU
jeeva
Me
Sudhakar
N hitesh
Participants (40)
Search
jeeva
Me
Prof K Sudhakar
Host
Deepak ROY
Prof K Sudhakar
Cohost
Chat
team 2: No Tax Energy
from utkarsh to everyone: 10:47 AM
Team 6: Angio-Prognosticator
To: Everyone
Unmute
Start video
Share
Participants
Chat
Type here to search
72°F
ENG
IN
10:58 AM
12/17/2021


Webex
Meeting Info
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01:34:05
File Edit Share View Audio & Video Participant Meeting Help
Speaking: N hitesh
Viewing N hitesh's applicati...
Layout
Motivation behind identifying the problem statement
Being a part of a nation whose major portion of economy is agriculture based the problems faced by the small scale farmers and the losses that they bare often due to unpredicted climatic conditions or lack of quality seeds.
jeeva
Me
N hitesh
Deepak ROY
Participants (43)
Search
jeeva
Me
Prof K Sudhakar
Host
N hitesh
Prof K Sudhakar
Cohost
Chat
team 2: No Tax Energy
from utkarsh to everyone: 10:47 AM
Team 6: Angio-Prognosticator
To: Everyone
Unmute
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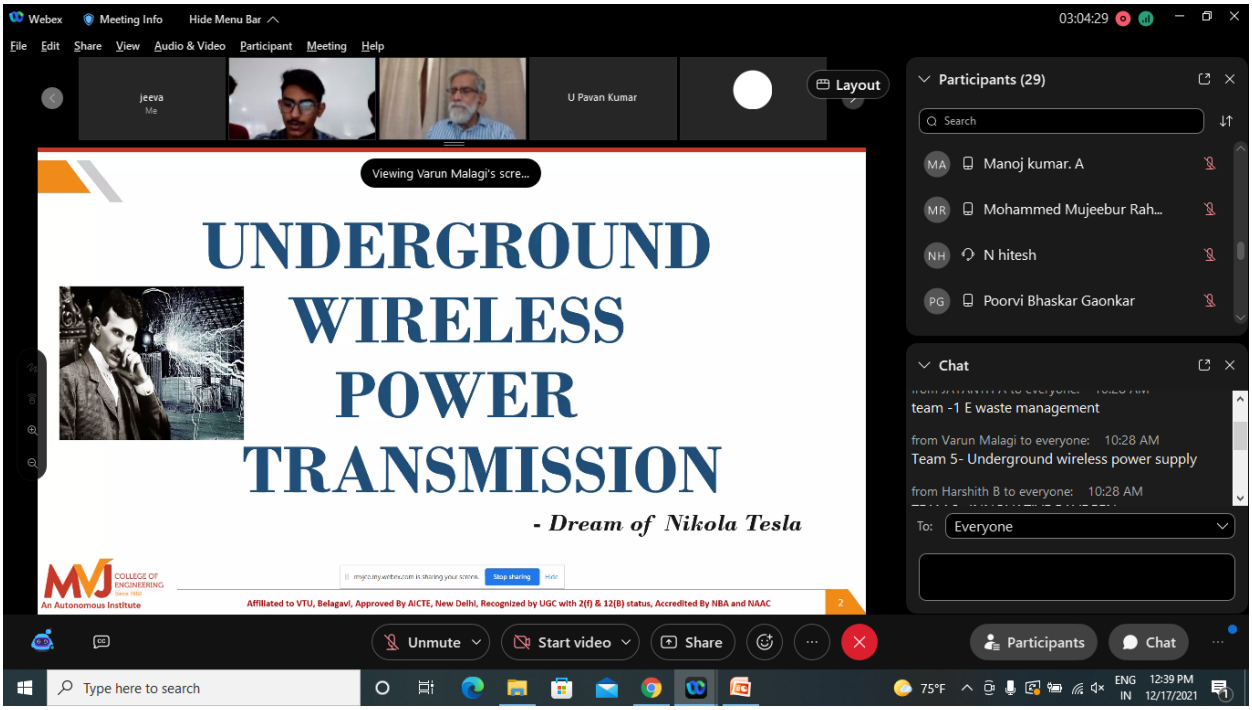
Webex
Meeting Info
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File Edit Share View Audio & Video Participant Meeting Help
03:04:29
jeeva
Me
U Pavan Kumar
Layout
Viewing Varun Malagi's scre...
UNDERGROUND WIRELESS POWER TRANSMISSION
- Dream of Nikola Tesla
MVJ COLLEGE OF ENGINEERING
An Autonomous Institute
Affiliated to VTU, Belagavi, Approved By AICTE, New Delhi, Recognized by UGC with 2(f) & 12(B) status, Accredited By NBA and NAAC
Participants (29)
Search
Manoj kumar. A
Mohammed Mujeebur Rah...
N hitesh
Poorvi Bhaskar Gaonkar
Chat
team -1 E waste management
from Varun Malagi to everyone: 10:28 AM
Team 5- Underground wireless power supply
from Harshith B to everyone: 10:28 AM
To: Everyone
Unmute
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Participants
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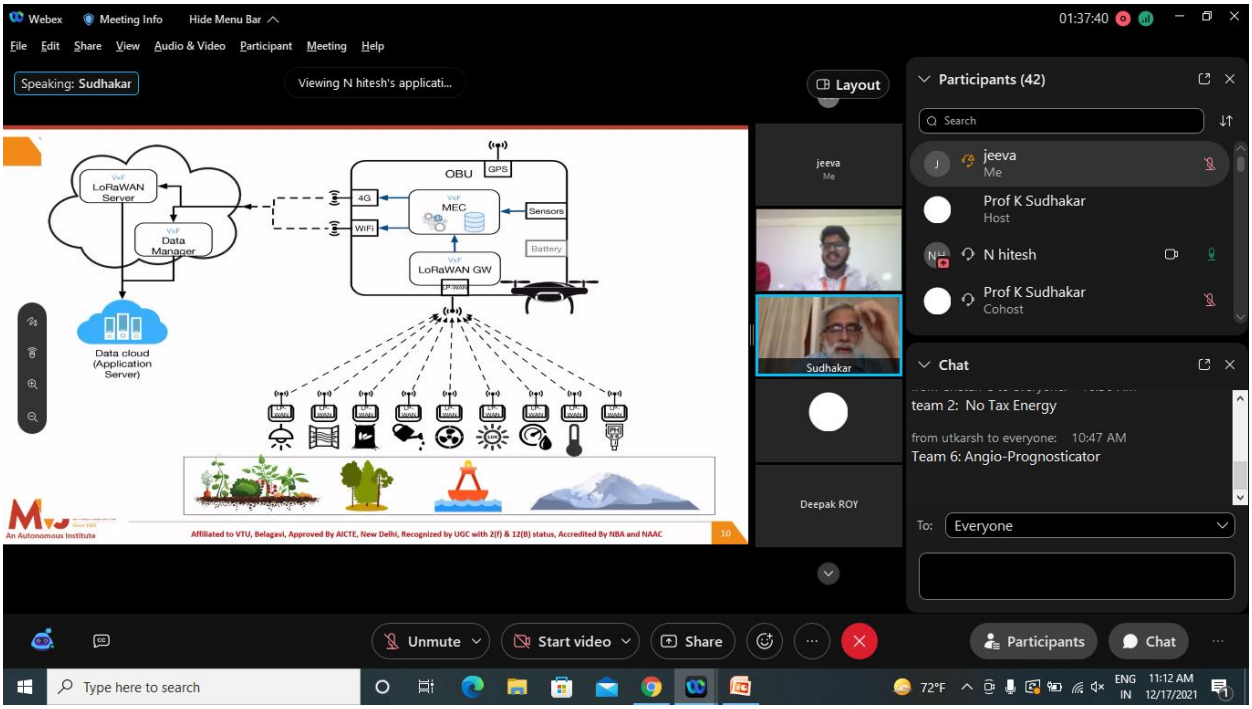
ENG IN
12:39 PM
12/17/2021


Webex
Meeting Info
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File Edit Share View Audio & Video Participant Meeting Help
01:37:40
Speaking: Sudhakar
Viewing N hitesh's applicati...
Layout
LoRaWAN Server
Data Manager
Data cloud (Application Server)
OBU
GPS
4G
WiFi
MEC
Sensors
Battery
LoRaWAN GW
jeeva
Me
Sudhakar
Deepak ROY
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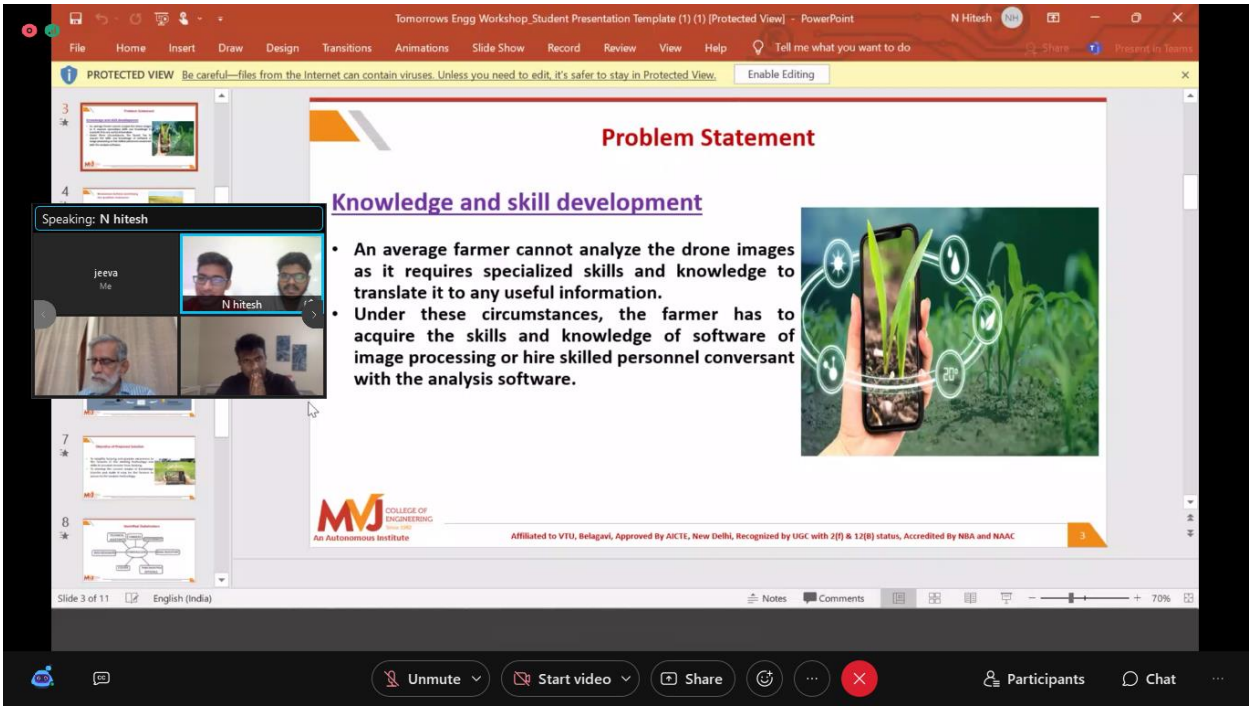
Participants (42)
Search
jeeva
Me
Prof K Sudhakar
Host
N hitesh
Prof K Sudhakar
Cohost
Chat
team 2: No Tax Energy
from utkarsh to everyone: 10:47 AM
Team 6: Angio-Prognosticator
To: Everyone
Unmute
Start video
Share
Participants
Chat
Type here to search
72°F
ENG IN
11:12 AM
12/17/2021


Tomorrows Engg Workshop_Student Presentation Template (1) (1) [Protected View] - PowerPoint
PROTECTED VIEW Be careful—files from the Internet can contain viruses. Unless you need to edit, it's safer to stay in Protected View.
Enable Editing
Speaking: N hitesh
jeeva
Me
N hitesh
Problem Statement
Knowledge and skill development
An average farmer cannot analyze the drone images as it requires specialized skills and knowledge to translate it to any useful information.
Under these circumstances, the farmer has to acquire the skills and knowledge of software of image processing or hire skilled personnel conversant with the analysis software.
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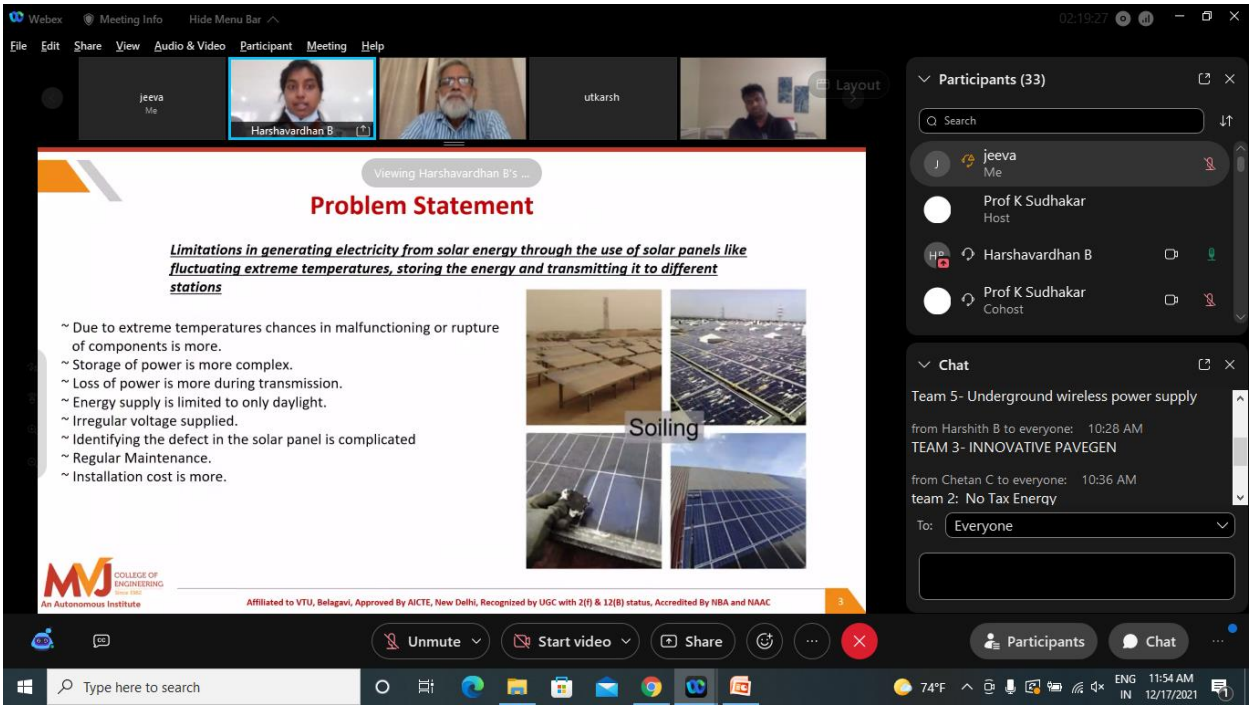
Unmute
Start video
Share
Participants
Chat


Webex
Meeting Info
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File Edit Share View Audio & Video Participant Meeting Help
jeeva
Me
Harshavardhan B
utkarsh
Layout
Viewing Harshavardhan B's ...
Problem Statement
Limitations in generating electricity from solar energy through the use of solar panels like fluctuating extreme temperatures, storing the energy and transmitting it to different stations
~ Due to extreme temperatures chances in malfunctioning or rupture of components is more.
~ Storage of power is more complex.
~ Loss of power is more during transmission.
~ Energy supply is limited to only daylight.
~ Irregular voltage supplied.
~ Identifying the defect in the solar panel is complicated
~ Regular Maintenance.
~ Installation cost is more.
Soiling
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Participants (33)
Search
jeeva
Me
Prof K Sudhakar
Host
Harshavardhan B
Prof K Sudhakar
Cohost
Chat
Team 5- Underground wireless power supply
from Harshith B to everyone: 10:28 AM
TEAM 3- INNOVATIVE PAVEGEN
from Chetan C to everyone: 10:36 AM
team 2: No Tax Energy
To: Everyone
Unmute
Start video
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Type here to search
74°F
ENG
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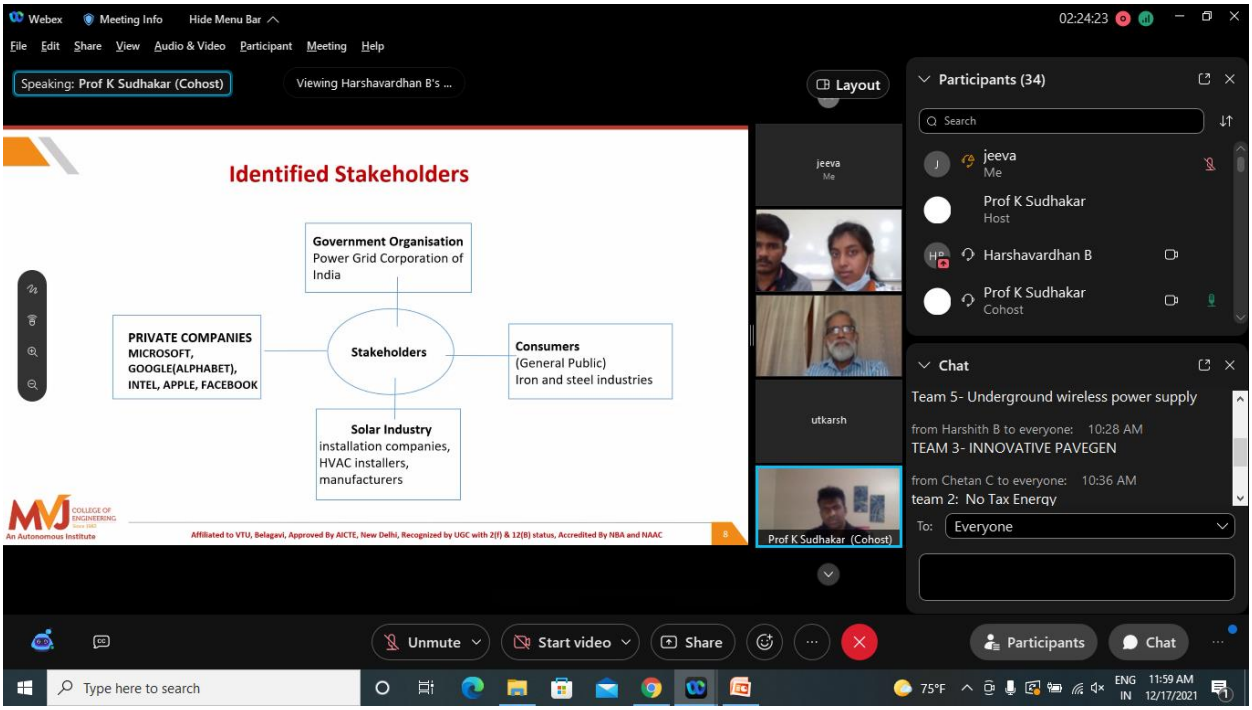
11:54 AM
12/17/2021


Webex
Meeting Info
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02:24:23
File Edit Share View Audio & Video Participant Meeting Help
Speaking: Prof K Sudhakar (Cohost)
Viewing Harshavardhan B's ...
Layout
Identified Stakeholders
Government Organisation
Power Grid Corporation of India
PRIVATE COMPANIES
MICROSOFT, GOOGLE(ALPHABET), INTEL, APPLE, FACEBOOK
Stakeholders
Consumers
(General Public)
Iron and steel industries
Solar Industry
installation companies, HVAC installers, manufacturers
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jeeva
Me
utkarsh
Prof K Sudhakar (Cohost)
Participants (34)
Search
jeeva
Me
Prof K Sudhakar
Host
Harshavardhan B
Prof K Sudhakar
Cohost
Chat
Team 5- Underground wireless power supply
from Harshith B to everyone: 10:28 AM
TEAM 3- INNOVATIVE PAVEGEN
from Chetan C to everyone: 10:36 AM
team 2: No Tax Energy
To: Everyone
Unmute
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Participants
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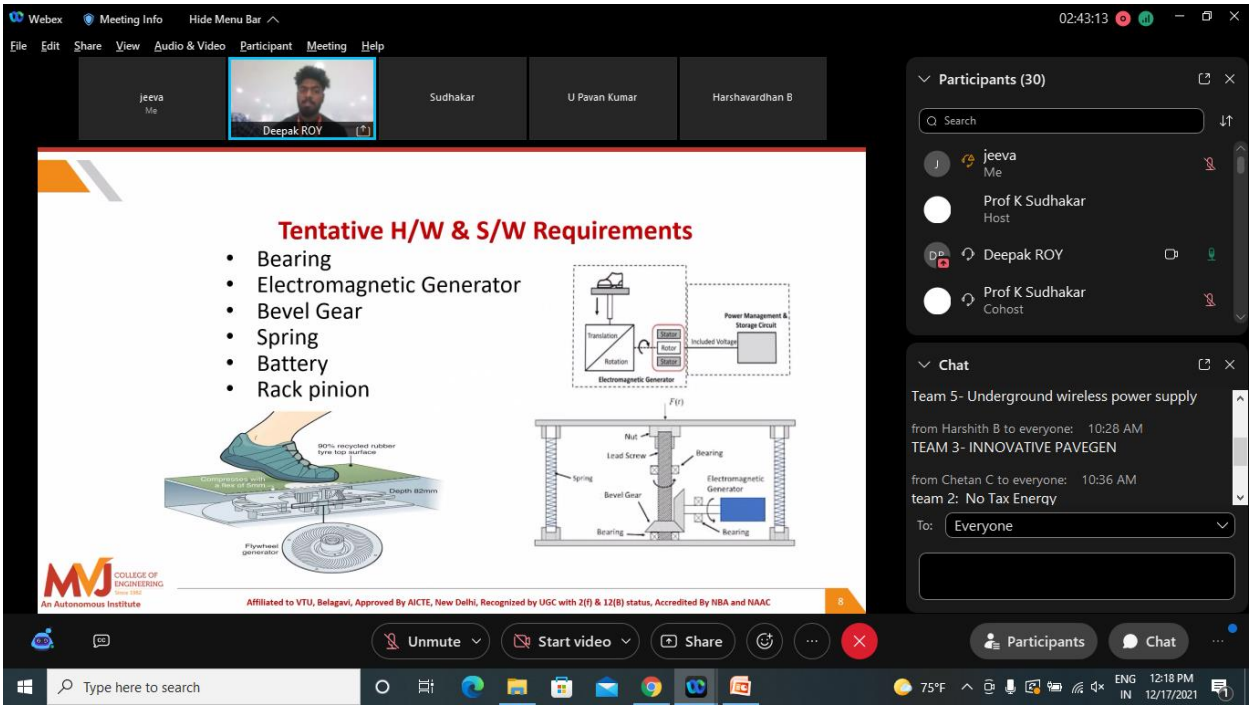
ENG IN
11:59 AM
12/17/2021


Webex
Meeting Info
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02:43:13
File Edit Share View Audio & Video Participant Meeting Help
jeeva
Me
Deepak ROY
Sudhakar
U Pavan Kumar
Harshavardhan B
Tentative H/W & S/W Requirements
Bearing
Electromagnetic Generator
Bevel Gear
Spring
Battery
Rack pinion
Translation
Rotation
Stator
Rotor
Power Management & Storage Circuit
Electromagnetic Generator
Nut
Lead Screw
Bearing
Spring
Electromagnetic Generator
Bevel Gear
An Autonomous Institute
Affiliated to VTU, Belagavi, Approved By AICTE, New Delhi, Recognized by UGC with 2(f) & 12(B) status, Accredited By NBA and NAAC
Participants (30)
Search
jeeva
Me
Prof K Sudhakar
Host
Deepak ROY
Prof K Sudhakar
Cohost
Chat
Team 5- Underground wireless power supply
from Harshith B to everyone: 10:28 AM
TEAM 3- INNOVATIVE PAVEGEN
from Chetan C to everyone: 10:36 AM
team 2: No Tax Energy
To: Everyone
Unmute
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12:18 PM
12/17/2021

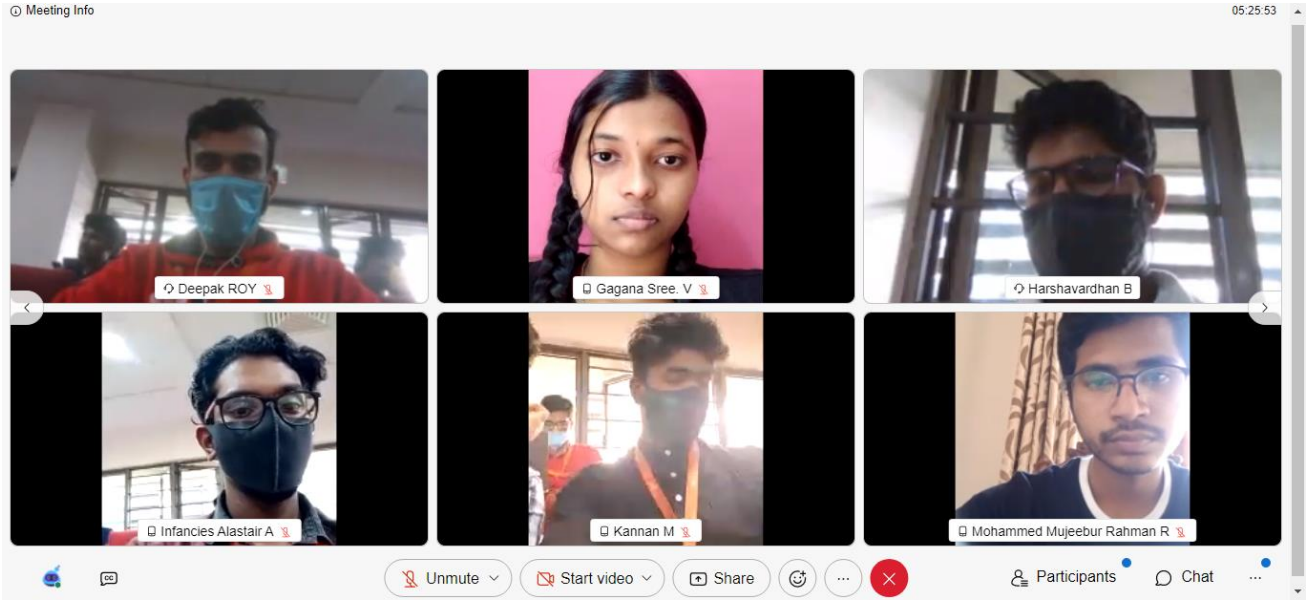
The Workshop concluded with vote of thanks to all the Resource Persons.

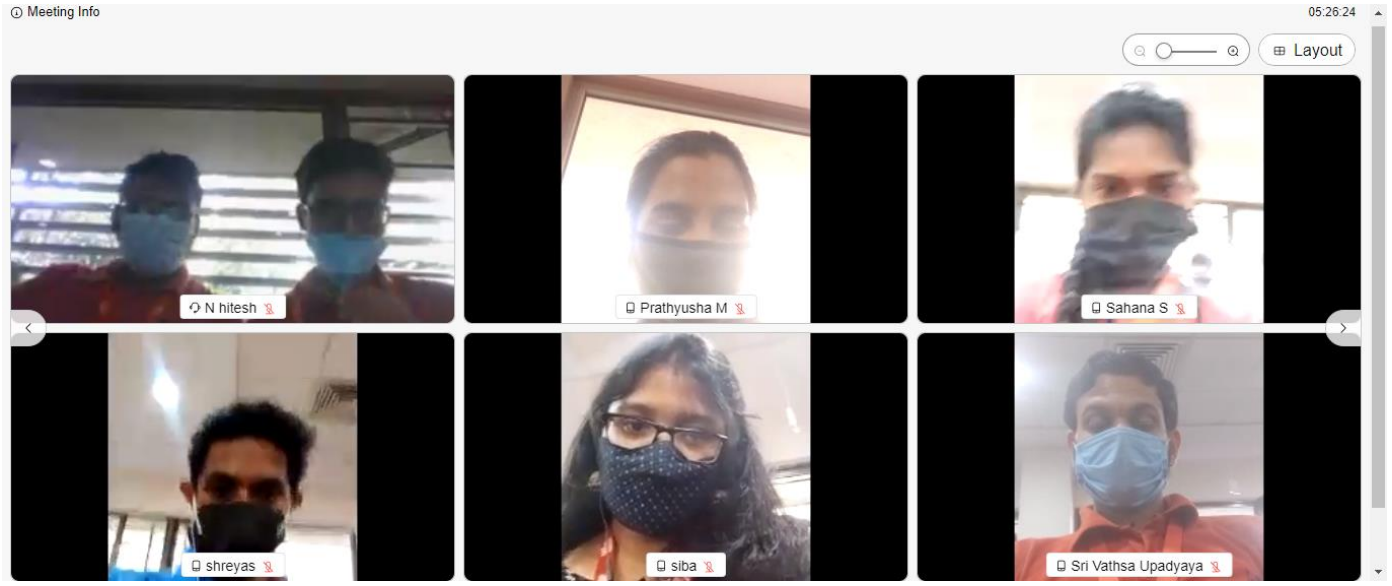
Outcome:

Students gained awareness about the importance of engineering, and they tried to solve a societal problem by applying new technologies. They were able to think beyond their curriculum, and learnt about problem-solving, and creativity and innovation in engineering. The Workshop helped them gain applied engineering knowledge and enhanced their personal skills. The students also understood the importance of thinking out-of-the-box, instead of following the traditional approach to solve a problem.

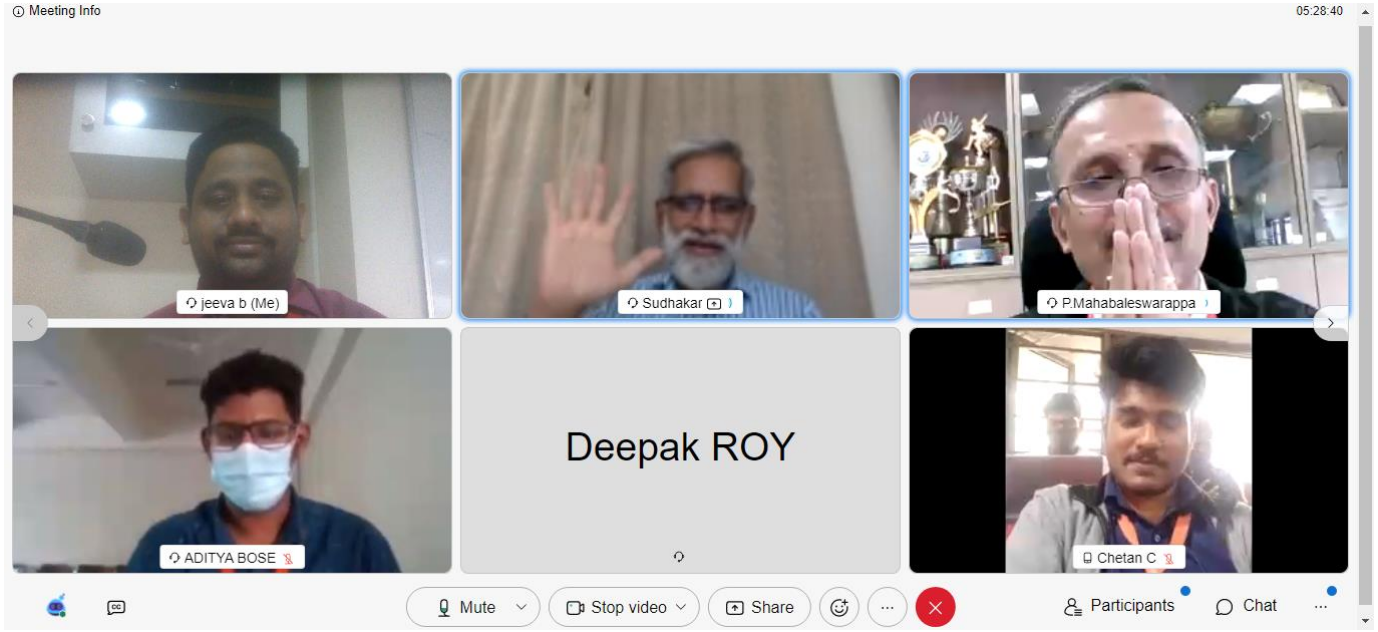
Group Photo: A 3-day Workshop on 'Design thinking, Creative Thinking, Innovation design and Problem-Solving'

Date and Venue: 17/12/2021; Seminar Hall 4





Online Group Photo1: A 3-day Workshop on 'Design thinking, Creative Thinking, Innovation design and Problem-Solving'



Online Group Photo2: A 3-day Workshop on 'Design thinking, Creative Thinking, Innovation design and Problem-Solving'