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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.

Cisco Webex Meetings Meeting Info Hide Menu Bar ^ File Edit Share View Audio & Video Participant Meeting Breakout Sessions Help Speaking: MVJ College of Engineering (Host)				
MVJ College of Engineering Cohost, me				Aravind kp
ARPITA CHOWDHURY	Ashwini B C	b mahammad sirajuddin	chandangowda .R	CHELVARAJ
dheeraj	Fireflies.ai Notetaker LAVANYA	GOKUL KUMAR M	GOVARDHAN B R	Hari Haran Murali
harshitha v	HIMANSHU UPADHYAY	Kavyashree C	kurmala TarunTeja	Likhitha M V
LIKI	Manoj	Manoj kumar	Manoj N	Mohammed numaan khan

MVJ College of Engineer... Cohost, me				Aravind kp
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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

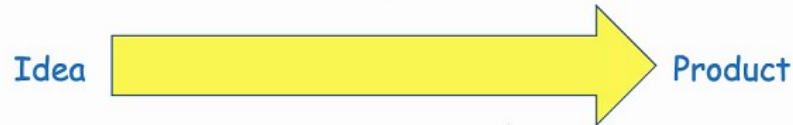
K. Sudhakar A.S. Shaja

With past links to
Department of Aerospace Engineering
IIT Bombay, Mumbai

Problem Solving - Importance of Creativity & Innovation

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

How to?



Science, Engineering, Design, Product

Science	Understanding what is there	
Engineering	Using knowledge of science, ... creating what isn't there	Who will use it? How will it be used? What will be expected?
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

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 enough information to answer lwe 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 avrager weight of 100 people as 50 kg ,then depending on the various parameters it	1/40	3
No Answer	22/40	55

Attendees	Results
Likhiha M V	
Mohammed numaan khan	Your Answer ✓
Shebin Joseph	How can we reduce air pollution using technology ?
Likhiha	
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	

(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



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:

Questions Responses 6

Kindly indicate Not less than 2 and up to 4 Needs (i.e problems that your team has shortlisted)

Need-1 Or Problem-1 *

disposal of garbage in trains and under the tracks

Need-2 Or Problem -2 *

vehicles for handicaps (auto self driven motorcycle)

Need-3 Or Problem-3

ensuring the safety of kids and old people

Need-4 Or Problem-4

control of dust and pollution in busy places

Team 2 Proposed Problem Statements:

Need-1 Or Problem-1 *

the problem faced in the language when we go to the place where the people less educated people area

Need-2 Or Problem -2 *

borewell resuses

Need-3 Or Problem-3

Need-4 Or Problem-4

Team 3 Proposed Problem Statements:

<p>Need-1 Or Problem-1 *</p> <p>monitor our house door for any thief and gather information about that thief using his fingerprint linked to his aadhar card</p>
<p>Need-2 Or Problem -2 *</p> <p>a dustbin which itself recognizes wet and dry waste and separate itself</p> <p>predetermining the taste of food that we are preparing before each item we mix</p>
<p>Need-3 Or Problem-3</p> <p>a software with animations and which is user friendly and creative facilities that helps teachers convert the books and lectures into animated lectures</p>
<p>Need-4 Or Problem-4</p> <p>sensor pen that corrects spelling mistakes and also used to copy notes and rewrite as well</p>

Team 4 Proposed Problem Statements:

<p>Questions Responses 6</p>
<p>Need-1 Or Problem-1 *</p> <p>Problem Statement 1: Finding empty and safe parking places for cars in a busy area.</p>
<p>Need-2 Or Problem -2 *</p> <p>problem statement 2:waste management</p>
<p>Need-3 Or Problem-3</p> <p>to solve the malnutrition problem in children</p>
<p>Need-4 Or Problem-4</p> <p>Alternative to hand bags</p>

Team 5 Proposed Problem Statements:

Questions	Responses 6
Need-1 Or Problem-1 *	Can bluetooth connection cannot be extended from meters to kilometres
Need-2 Or Problem -2 *	<p>I have one problem statement guys</p> <p>" we need to have one AI based app or website to give instruction to the Traveller or to route him to the traffic free cut route way in case of urgency"</p>
Need-3 Or Problem-3	<p>now students are looking to earn many online and get into scams we can find a solution so that everyone find a simple job and earn money for student; like now web have freelancing</p>
Need-4 Or Problem-4	<p>The technology is improved ..why do army needs oly humans why not robots can b trained so tht we won't lose our people</p>

Team 6 Proposed Problem Statements:

Questions	Responses 6
Need-1 Or Problem-1 *	Can bluetooth connection cannot be extended from meters to kilometres
Need-2 Or Problem -2 *	<p>I have one problem statement guys</p> <p>" we need to have one AI based app or website to give instruction to the Traveller or to route him to the traffic free cut route way in case of urgency"</p>
Need-3 Or Problem-3	<p>now students are looking to earn many online and get into scams we can find a solution so that everyone find a simple job and earn money for student; like now web have freelancing</p>
Need-4 Or Problem-4	<p>The technology is improved ..why do army needs oly humans why not robots can b trained so tht we won't lose our people</p>

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

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Cohost, me


MVJ Colle... (Host)

Manoj

almisbah



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!**

State the Problem correctly.
Confirm if that is the problem to be solved.

"Problem well stated is half solved", Charles Kettering

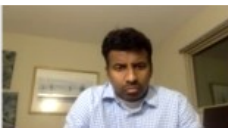
"Problem well stated attracts better solutions"

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almisbah

Amrutha MC




What is meant by "State the Problem Correctly?"

"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 wanted 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!



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

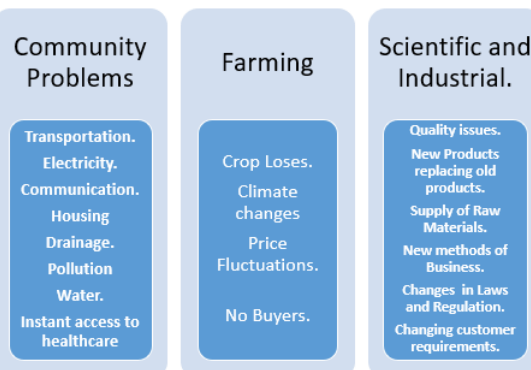
Day 2 (16.12.2020):

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.

Attributes of an Engineer

- ✓ Critical thinking
- ✓ Open mind & positive attitude
- ✓ Resourceful
- ✓ Implementing ideas
- ✓ Cooperative.
- ✓ Strategic designer
- ✓ Ethics practitioner

Few Problems Around Us



AAC

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

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

Who can be a stakeholders ?

- Customers
- Employees
- Local communities
- Suppliers and distributors
- Shareholders
- The public in general
- Business partners
- Past and Future generations
- Academics
- Competitors
- Government and Non Government Organisations
- Trade unions or trade associations of suppliers or distributors
- Competitors
- Media

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)

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

The screenshot shows a Zoom meeting interface. At the top, there is a header bar with four participant tiles: 'MVJ College of Engineer... Cohost, me', 'almisbah', 'Amrutha MC', and 'MVJ College of Engineer... Cohost'. Below the header, a large presentation slide is displayed. The slide has a white background with blue text. The title is 'Problem Solving -Importance of Creativity & Innovation'. Below the title, it says '3-Day Workshop on "Creative Thinking, Innovation and Problem Solving"'. The dates 'December 15-17, 2020' and the location 'MVJ College of Engineering, Bengaluru' are listed. In the bottom right corner of the slide, the names 'A. S. Shaja' and 'K. Sudhakar' are written in red. A small status bar at the top of the slide area says 'Viewing MVJ College of En...'. At the bottom of the Zoom window, there are standard navigation icons for a presentation.

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Amrutha MC

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Problem Solving -Importance of Creativity & Innovation

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December 15-17, 2020
MVJ College of Engineering, Bengaluru

A. S. Shaja
K. Sudhakar

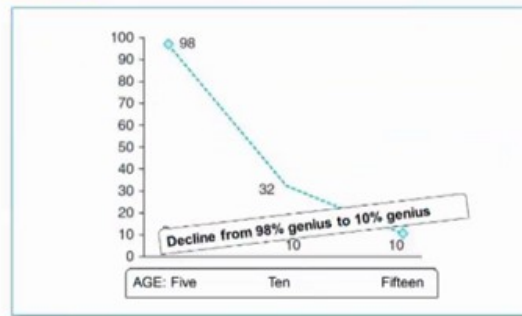


Do schools kill creativity?



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

Figure 0.1 Decline of Creativity by Age



SOURCE: Land & Jarman, 1992.



Torrance Viewing MVJ College of En... eativity



	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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 MVJ College of Engineer... Cohost
 GOVARDHAN B R
 kurmala TarunTeja

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Functionality Framework

New Technology
 Old Technology
 Old Functionality
 New Functionality

Process Improvement
 Breakthrough Innovation
 Commodity
 Product Improvement

Resistor
 LED
 Camera
 Monitoring

taking pics

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 MVJ College of Engineer... Cohost
 GOVARDHAN B R
 kurmala TarunTeja


'Write' function - Improvement with new, new technology

Performance
 time
 Cave art
 Jump in performance
 In life refinement of technology
 Saturation
 Clay tablet New technology

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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GOVARDHAN B R

kurmala TarunTeja

Source of Innovation

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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Cohost


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GOVARDHAN B R

kurmala TarunTeja

Source of Innovation

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

BoS-4

1. State the problem (Reword it.
Keep in mind what we all told you)
2. List the stakeholders
3. List what each stakeholder will expect?

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

Speaking: Amrutha MC

MVJ College of Engineering Host, me	MVJ College of Engineering Cohost		almisbah	Amrutha MC
Aravind kp	ARPITA CHOWDHURY	Ashwini B C	GOVARDHAN B R	b mahammad sirajuddin
CHANDAN GOWDA R	Chelvaraj	dheeraj	harshitha v	HIMANSHU UPADHYAY
kurmala TarunTeja	Likhitha M V	Likhitha	Manoj	Mohammed numaan khan
Nihitha	Nishchinth T N	Rajath	Sripriya K	Theertha

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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Host, me

 MVJ Co... (Cohost)

Aravind kp



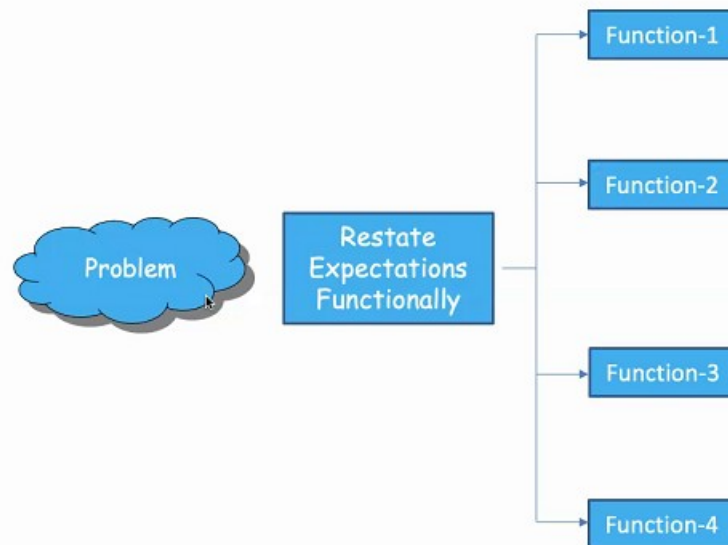
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Concept Generation Process



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

Simple Need Vs Complex Need

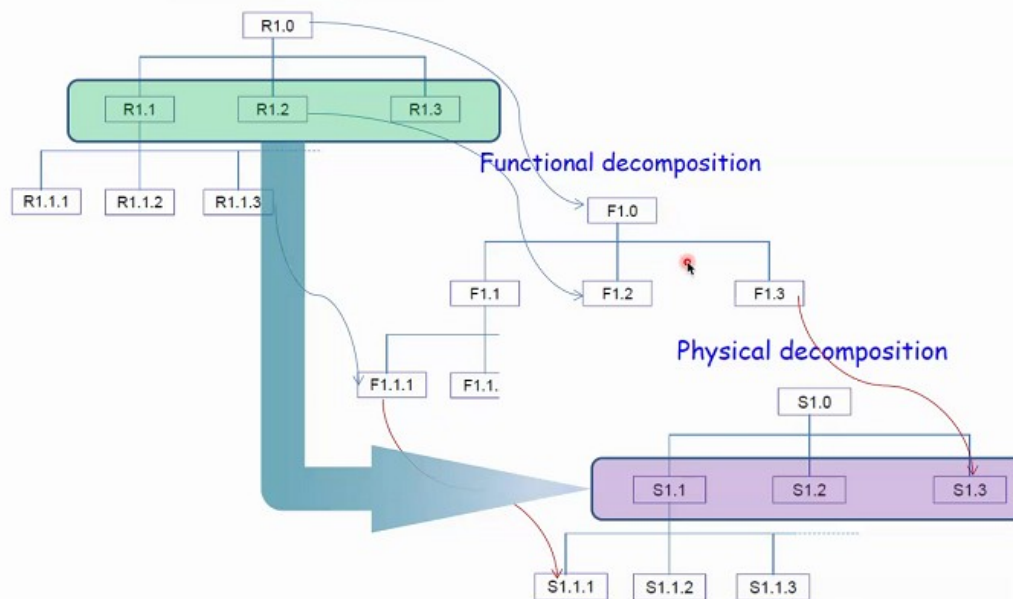


Viewing MVJ College of En...

System Views

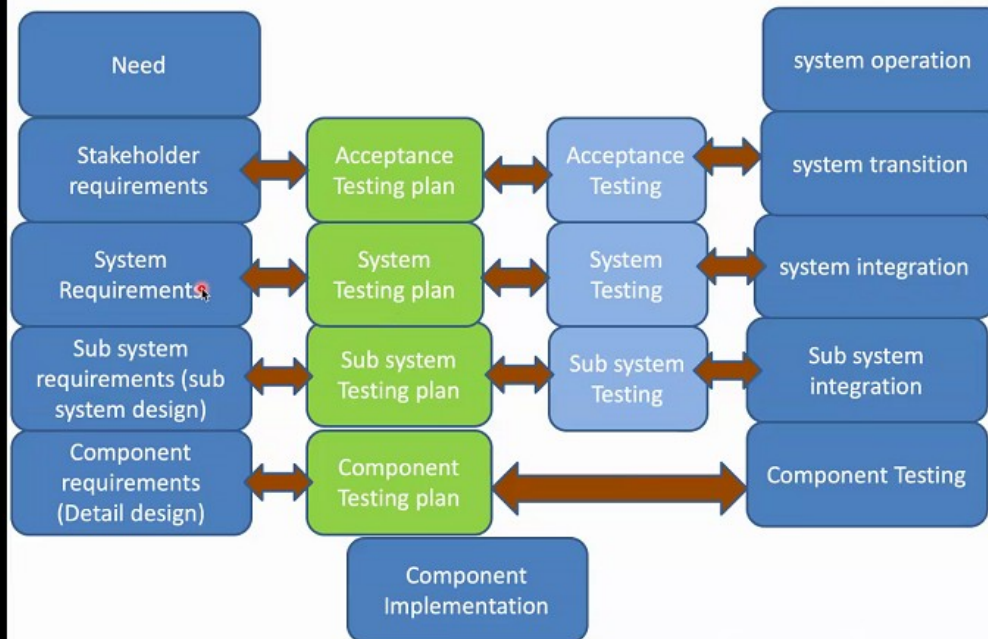


Requirement decomposition





System development stages



Example : Need → Pen to write



Student "Need a pen to write"

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

Need

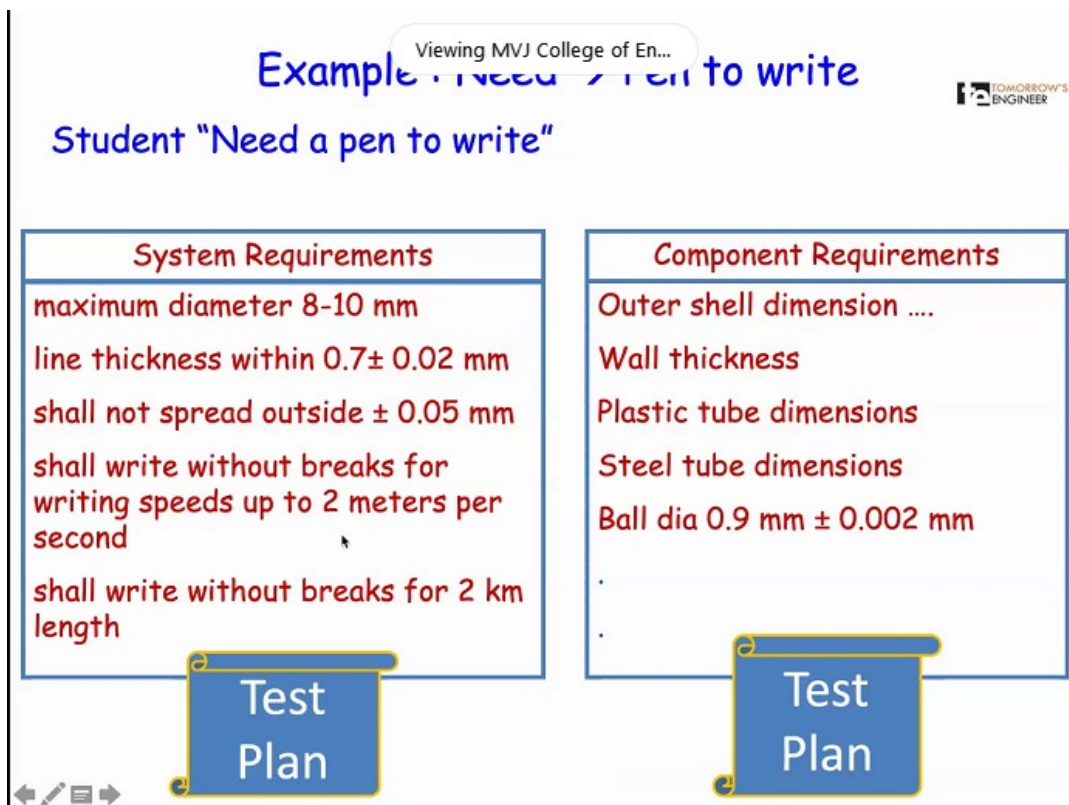
Easy to hold
Consistent line thickness
No smudging
No breaks while writing
Last for at least one notebook

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:

Facebook: <https://bit.ly/3qInT0P>

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

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

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