



Class 3

Critical Thinking



Everything we hear is an opinion, not a fact;
everything we see is a perspective, not the truth.

- **Roman Emperor Marcus Aurelius The Philosopher** -

Learning Objectives

01.

Understand the importance of critical thinking as a basis for effective problem solving

02.

Utilize tools and frameworks to define problem statement and root causes

Why is Critical Thinking **Important?**

1. It enables you to be a great problem solver



Albert Einstein once said, "It's not that I'm so smart, it's just that I stay with problems longer."

Critical thinking safeguards you against automatic thought process: making decisions based on personal biases, self-interest, or irrational emotions. Critical thinkers strive to be curious—to understand the links between ideas and the relevance of arguments first, and then to ultimately be able to solve the problems that matter in the most correct way.

To illustrate, the usage of a recommendation feature dropped below what is expected. A critical thinker will prompt triggering questions such as: Why did the metrics drop? Who was impacted by this? Which variable affected this?

Why is Critical Thinking **Important?**

2. It helps you to be more independent



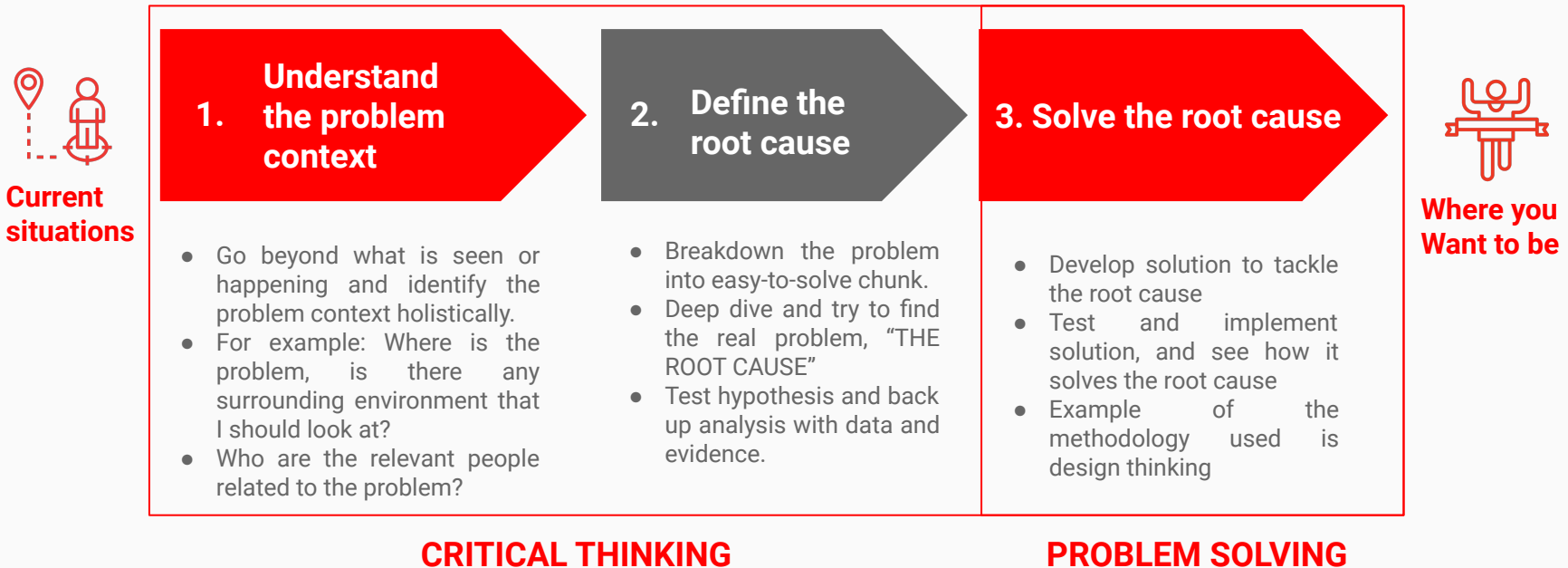
Critical thinking is the cornerstone of self-development and improvement. Rather than blindly following what others think or say, critical thinking allows you to sort through the noise and make critical, well-informed decisions on your own. Critical thinkers build confidence and discipline by continuously evaluating their views and decisions.

Without analyzing the reasons behind decisions and tasks, it becomes very easy to adopt bad habits, such as time-wasting meetings, or inefficient uses of effort.

Taking the time to ask “why” you’re doing something is the first step to thinking critically.

The Framework for an Effective **Critical Thinking**

Having understood the importance of critical thinking, in this module, we will focus on how we can use critical thinking as part of **problem solving**. The following is a framework to solve the problem effectively.

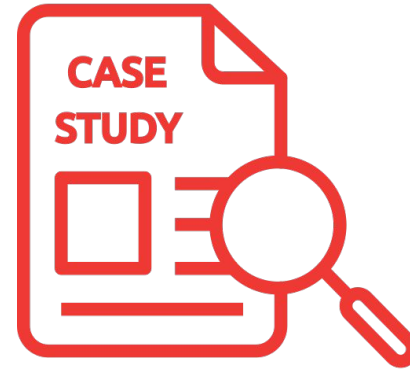


Case Study

A real problem in India

- In India, out of 27 million babies born every year (2010 data), 3.5 million babies born are premature. Newborn deaths (those in the first month of life) account for 40 percent of all deaths among children under five years of age.
- Malnourished mothers will result in high rate of babies born prematurely or underweight .
- In order to survive, the babies born prematurely need to be kept in incubators.
- Incubators are only available in select large hospitals and in general are very expensive.

Think of what first comes to your mind to solve this situation.



Source:

<https://www.nhp.gov.in/disease/reproductive-system/female-gynaecological-diseases-/preterm-birth>

Solution to the Case of **Premature Babies Born in India**

This is one of the possible
solutions already introduced to
the market:

Embrace Infant Warmer



Find Out how Embrace **Infant Warmer** Goes through **Several Testing Processes**



Find Out how Embrace **Infant Warmer** Goes through **Several Testing Processes**



Source: [TED Archive](#)

The Framework for an Effective **Critical Thinking**

Do you realize that when people are challenged to solve an unpleasant situation, we tend to jump straight ahead to Step 3 - Offering Solutions?



**Current
situations**

1. Understand the problem context

- Go beyond what is seen or happening and identify the problem context holistically.
- For example: Where is the problem, is there any surrounding environment that I should look at?
- Who are the relevant people related to the problem?

2. Define the root cause

- Breakdown the problem into easy-to-solve chunk.
- Deep dive and try to find the real problem, "THE ROOT CAUSE"
- Test hypothesis and back up analysis with data and evidence.

3. Solve the root cause

- Develop solution to tackle the root cause
- Test and implement solution, and see how it solves the root cause
- Iteratively seek for opportunities to improve and enhance the solution
- Example of the methodology used is design thinking



**Where you
Want to be**

CRITICAL THINKING

PROBLEM SOLVING

The Framework for an Effective **Critical Thinking**



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**Where you
Want to be**

CRITICAL THINKING

PROBLEM SOLVING

Understand the **problem context**

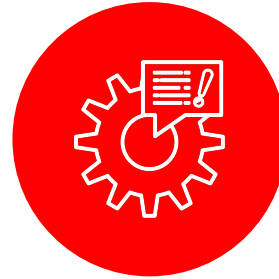
Problem Definition Workflow



WHO



SITUATION



COMPLICATION



and then prepare
the **PROBLEM
STATEMENT**

Go beyond what is seen or happening and identify the problem context holistically



WHO: Understand WHO is related to the problem.

- To start, ask yourself: who experienced or is experiencing the problem? There must be someone.
- Then, also explore other parties who are related to the problem (directly or indirectly).
- Define the relationships between the WHO(s)



SITUATION: Objective fact and evidence representing the current condition or is the non debatable starting point

- Observe the situation comprehensively from various angles
- Gather data, numbers, fact, evidence
- Be careful with bias as it may influence how you view the situation. Differentiate facts and opinions, and ensure to note whose point of view does the insight come from



COMPLICATION: The condition, or the “burning bridge”, that needs to be addressed immediately.

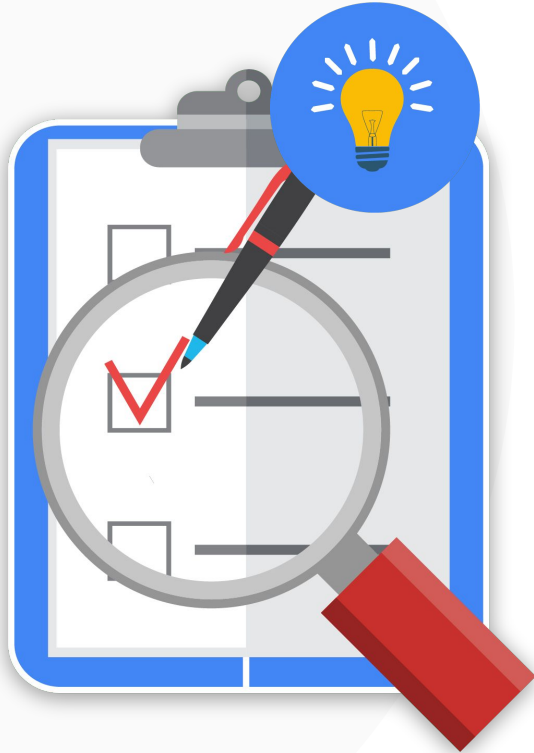
- Identify the threat or opportunity that the situation brings
- Identify the “something” that blocks the way to get what is desired



PROBLEM STATEMENT :

- Focus on a simple single question that encapsulates the situation and complication
- Don't try to solve multiple questions at once
- It should be phrased clearly and accurately
- It focuses its attention on the most important complication
- Addresses the need to change

Determining a **Good Problem Statement**



A good problem statement should

- Be relevant to the who is involved, the objective situation that is happening and complication that is caused by the situation
- Not be too broad and vague
- Not be too narrow
- Should only concentrate on addressing one single question

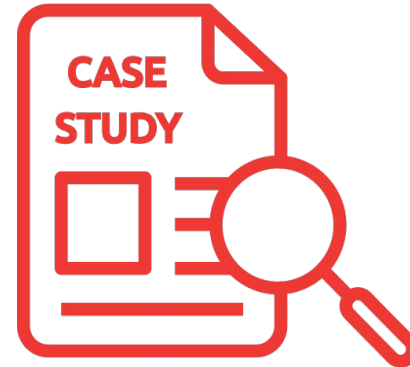
Let's take a look at a real example to avoid the common pitfalls when defining a problem statement.

Case Study

Let's take a look once again at the problem in India.

- In India, out of 27 million babies born every year (2010 data), 3.5 million babies born are premature. Newborn deaths (those in the first month of life) account for 40 percent of all deaths among children under five years of age.
- Malnourished mothers resulted in high rate of babies born prematurely or underweight.
- In order to survive, the babies who were born prematurely need to be kept in incubators
- Incubators were only available in select large hospitals and are in general very expensive.

Define the problem statement using the Problem Definition Workflow.



Answer

WHO:



- Primary actors involved in this are the mother, the baby, and their family, which will mourn for the death of their family member.
- In addition, the medical practitioner cannot contribute optimally to save a life.

SITUATION:



- $\frac{1}{8}$ babies born prematurely in India
- Premature babies need constant warmth to grow and stabilize, which at the time being can only be assisted by incubators

COMPLICATION:



- Incubators are out of reach, only available in large hospitals and are costly for many families
- Premature babies were born from malnourished mothers who generally lived below the poverty line

PROBLEM STATEMENT:



- How can we provide accessible incubation services to mothers and their premature babies who live below the poverty line?

How You Can Understand **The Problem Context Better**

Here are the tips so you can understand the problem context better:

1. Don't look only at the tip of the iceberg and directly jump into solutions

Example: A doctor giving prescription to cure headache based only on the patient's testimony. Headaches, however, can occur because of many reasons, from mild to extreme causes.

2. Do not continue any of your assumptions with no strong data/evidence to support

Example: A UX team decided to change the interface of their e-commerce app based on a survey results from 50 respondents. Depending on the target audience the app tries to reach, it might not be enough to warrant a change in the user flow.

3. Hesitate to critique to avoid arguments

Example: A software engineer accepted an idea from her manager as plausible despite feeling that it hasn't been comprehensively proven. She didn't want to upset the relationship with her manager, thus prioritizing harmony instead.

How You Can Understand **The Problem Context Better**

Here are the tips so you can understand the problem context better:

4. **Over-reliance on feelings or emotions**

Example: A manager is excited to launch a fitness app because he feels that the current health trend provides a sure-fire way to success. Due to his over-excitement, he overlooked the analysis part and jumped straight ahead to evaluation and testing, where at the end he found out that the app is not suited to its target market's needs.

5. **Selective perception or confirmation bias**

Example: Panji is assigned to a market research project to determine which industry the company should enter. He thinks that it should be wellbeing, but the data says otherwise. Instead of accepting the data, Pandji began to research sources and did his own testing to prove that his preconception is accurate and the right move for the company.

Further Methodology to Understand The Problem Context Better

Let's learn more about Open Ended Interview method. There is other option that **you can explore to understand the problem context better** when you don't have sufficient data, which is:



Open
Ended
Interview

We will explain further in the next few slides on how you can utilize the benefits of the methodology.

Open-Ended Interview Questions can Also Be Used to **Define the Real Context**

Interview is a relatively quick process that you can do to understand the context of the problem. **Ensure that you are asking in a way that encourage your interviewee to tell their story about his/ her experiences.**

- | | |
|--|---|
| <ul style="list-style-type: none">• Tell me about ...• What do you think about ...• How do you feel about ...• Why do you think ...• What happens if a hypothetical situation is introduced ...• How do you see ... | <ul style="list-style-type: none">• e.g Tell me about your experience working remotely.• e.g. What do you think about the current system you are working with?• e.g. How do you feel about the working experience in your organization?• e.g. Why do you think the sales is declining rapidly?• e.g. What happen if the additional approval step is introduced in this process?• e.g. How do you see this technology supporting your business in the next 5 years? |
|--|---|

Open-Ended Interview Questions can Also Be Used to **Define the Real Context**

When you're interviewing someone, remember that you're not there just to find a yes or no answer. Defining a problem context requires you to understand the full world view from the people who directly or indirectly affected by it.

Here are some guidance that can help you to formulate the right questions:

TIPS

- ✓ Catch not only the words but also the emotion
- ✓ Make your questions an open ended questions
- ✓ Be prepared with items you want to ask
- ✓ Prepare the follow-up questions if you feel unclear and need to clarify provided explanations, such as "so are you saying that the situation is"
- ✓ Storytelling! Don't make it like Q&A, but has to follow and make the respondent feel like they are sharing their stories with their friend.
- ✓ If possible, do it in team (1 asking questions, 1 taking notes). Working on both is possible, but dividing tasks will make it easier for you to focus understanding the words and emotions.

The Framework for an Effective **Critical Thinking**



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Where you Want to be

CRITICAL THINKING

PROBLEM SOLVING

When you start to define all the possible root causes you actually started to follow a concept that is used in many leading consulting firms.

In the following section, we are going to introduce you to a structured way of thinking called **MECE**.

Introducing MECE Guiding Principle in Breaking Down Problem Statement

MECE

Mutually

Exclusive

Collectively

Exhaustive

Is each point used only once
and in the best place?

Do we have all the points we
need to support or defend the
same message?

Other term that you can use with similar understanding is **NONG, No Overlap No Gap**

Introducing MECE Guiding Principle in Breaking Down Problem Statement

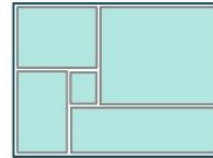
MECE Definition

Mutually Exclusive

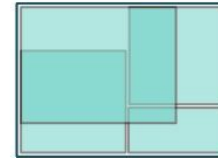


Exclusive

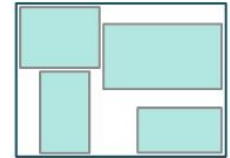
Collectively Exhaustive



MECE/NONG



Overlaps



Gaps

Example of
applying MECE
for problem
solving in daily
life situation

Grouping Customers by their ages is an example

MECE

Mutually Exclusive

No one individual can appear in more than one category.

Collective Exhaustive

The age groupings taken as a whole cover the entire population

Total Population



Other example of applying MECE for problem solving in daily life situation



Other example of **applying MECE** for problem solving in daily life situation



How do I save \$3,000
for vacation next year

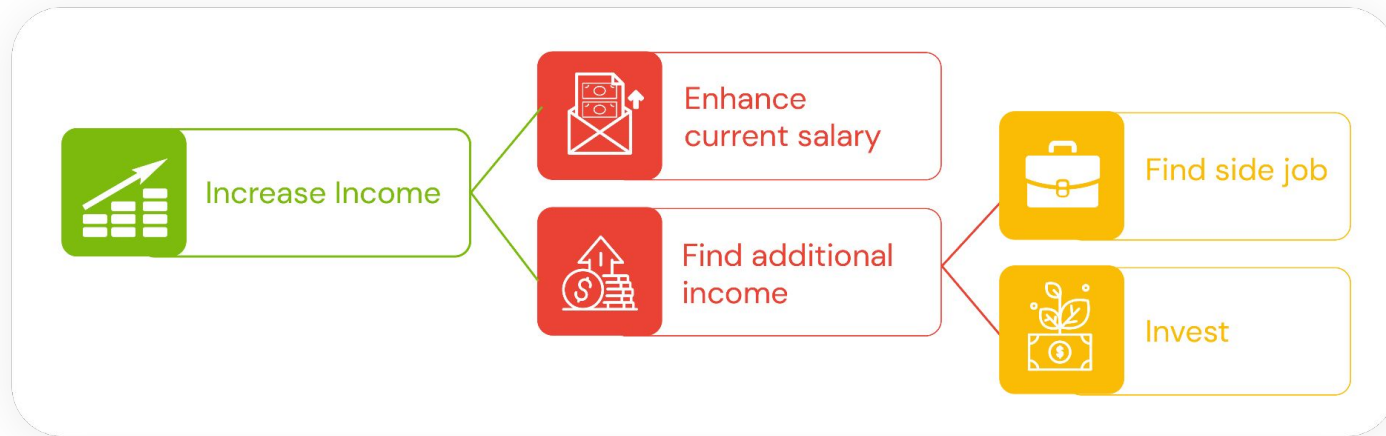


Increase Income



Reduce
Daily Expense

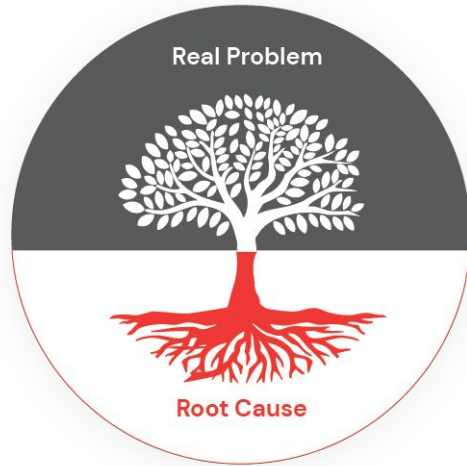
Other example of **applying** **MECE** for problem solving in daily life situation



Other example of applying MECE for problem solving in daily life situation



Deep dive and try to find the real problem, the “root cause”



You have identified the problem statement. You also have an understanding of the right thinking process to tackle that problem statement.

Now you can combine the two to really discover where the root cause lies using a framework called **“5 Whys Analysis”**.

5 Whys Analysis

The 5 Whys method is a simple brainstorming tool that helps you identify a problem's root causes.

After identifying the initial problem, **you ask “Why” 5 times (or less)** until you narrow the problem down into **one or more key root causes** that you can focus your efforts and attention on.

Go through the exercise until you arrive at a conclusion.

Late for Work

Why
?

I arrived late at the office

Why
?

there was a traffic

Why
?

I forgot to check
the traffic

Why
?

I didn't allocate the
time properly

Example of 5 Whys usage at its simplest form.

5 Whys Analysis



Example of finding one possible root cause:

Why did our company's server crash too often recently?

Why did it crash? Because an API was introduced to that server

Why is that API important? Because we just launched a new feature which uses that API

Why didn't the API work if it's an important part of the feature? Because we had an engineer who was new and didn't know how to use that API properly

Why can't they use it? Because the engineer was never trained

Why is that? Because there is no training introduced by the company

Breakdown Problem into **Easy-to-Solve Chunk**

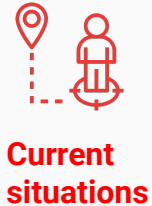
When a problem statement is identified, some ideas have usually already appeared in our minds. Did our product have some defects? Do our customers know how to operate it?

Having these ideas already popping up is a good step of being a critical thinker. However, these ideas might have been scattered and tangled all over in our mind, which means that we need to **structure them into overarching topics** where those ideas can fall under them nicely.

There are several available frameworks that you can use to breakdown problem statement into several overarching topics. These frameworks allow you to **trace how something is developed to deliver the intended results**, which can become a helpful starting point to identify the overarching topics. Understanding the flow of the process makes it easier to identify in what stage the problem occurs and other parts that might be affected by it.

Visit www.ease.io to access other available frameworks that can help you define the root cause of a situation.

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CRITICAL THINKING

PROBLEM SOLVING

Test and implement the solution.

See how it solves the root cause.

This module will not delve too deeply on this step, as it requires understanding of Design Thinking method.

What we would like to share with you now is, even though you might come up with a solution, you always need to reiteratively test the solution so you can improve the solution and arrive at the best possible outcome.

Remember this concept: “Fail-fast, succeed faster.”

1. Once you come up with a prototype, **directly test it** whether it tackles the problem.
2. Observe directly so you can **identify** whether there are **pain points**.
3. If the solution doesn't fit, **don't wait for perfection**. Avoid taking a long time to improve the solution.
4. Based on the data and insights from the previous solution, you should've **identified several aspects** that you can **fine tune**.
5. **Repeat the process** until the solution fixes the root cause.

**“Fail Fast,
Succeed Faster”**

**Example:
Changi Airport**



(Source: [National Geographic](#) on 3:18 - 4:50 & 19:50 - 21:30 - 22:00)

Final Notes

Tips and example on how you should ask your supervisor so you can **fully understand the root cause of the task you are assigned to**

- ✔ Oftentime, when you are working, you are assigned to a job that you might not have a full understanding of what the problem context is. Your supervisor might have just given you the things to do (i.e. the solution) along with the timeline for you to complete the work. Ideally, the supervisor should have provided you the context or involve you in the process, but the reality in the workplace, you might not always be given the chance to brainstorm together.
- ✔ As we have learned in this module, there is a possibility of more important root causes that could lead to better solutions. Here are some tips and example of how you can understand the problem context and root cause better if you are not involved from the very beginning.

Tips and example on how you should ask your supervisor so you can **fully understand the root cause of the task you are assigned to**

- ✓ **Ask politely.** You can ask your supervisor about the problem statement and root causes of the work. Inquire who will benefit from the task or what will this task bring to the company/ of your division upon completion. You could quickly run through the process using the Problem Definition Workflow together with your supervisor.
- ✓ If you still haven't received the explanation you need, you can **start working on whatever is assigned to you**. However, you could ask to **create some work pit stops** that will help you to constantly check if your work is what is expected from your supervisor.
- ✓ As you have understood the benefit of applying critical thinking, you should **help your team to implement this process** so it becomes a **workplace habit**.

Takeaways to help you **think critically**



Try to look at multiple scenarios to find out why things are happening. For example, when you have an argument about a iteration with the business user, try to understand the reasoning of his argument, you may find a better idea when you understand the true needs.



Do more research to have a better point of view. The more information you have, the better prepared you will be to analyze a condition and come up with a reasonable solutions to your query.



Framework is just a tool. By familiarizing yourself with the process, your thinking will become disciplined and it will naturally be part of your second nature. For example, when you face a situation, you might be able to quickly form a mental process to naturally breaking down problem and defining root causes.

Thank You