



CRITICAL THINKING AND PROBLEM SOLVING

DR. SAMEIR M. HAMMAD

ASSISTANT PROFESSOR, ARCHITECTURAL ENGINEERING DEPARTMENT, BENHA FACULTY OF ENGINEERING



WHAT IS .. CRITICAL THINKING

- Learning how to answer and ask questions of evaluation, analysis, and synthesis.
- Puts learners in the role of problem solvers.
- Students reflect on their own thinking processes.
- Expands the learning experience and makes language.
- learning more meaningful.

WHAT IS .. CRITICAL THINKING

- Critical Thinking is the three-sided mirror of decision making; letting you look at all the angles to make the best possible choice.



WHAT IS .. CRITICAL THINKING

- “Critical thinking is **harder** than people think, because it requires **knowledge**.”

Joanne Jacobs

- “Thinking is the **hardest work** there is, which is probably the reason why so few engage in it.”

Henry Ford

PROCESS OF CRITICAL THINKING



INFORM & DESCRIBE

Clarify

- What you need to know.
- What you already know.
- Information you have about the issue.

DISCOVER & EXPLORE

- Look at your issue more closely.
- Start to be more directed and purposeful in seeking information.

TEST & REVISE

- Weigh the evidence.
- Test out different ideas.

INTEGRATE & APPLY

- Bring together various ideas.
- Consolidate and articulate new understandings.

IMPROVING CRITICAL THINKING

- **Seek out ideas .. old and new**
 - Read books, periodicals, articles, etc.
 - Experiment, brainstorm, have discussions, attend exhibits
- **Take action**
 - Dare to be different!

IMPROVING CRITICAL THINKING

- **Be open minded and flexible.**
- **Apply ideas to every facet of your life.**
 - Always ask, “How can this be done better?”
- **Study innovation, change, and creativity.**

IMPROVING CRITICAL THINKING

- **Be curious and observant.**
 - Look at situation through the eyes of a child.
 - Keep asking, “why”.
- **Ask good questions.**
 - Constantly reflect on each aspect.
 - Who, what, where, when, why, how, if, etc.

IMPROVING CRITICAL THINKING

- **Develop your reflective thinking skills**
 - Daydream about the situation
 - Jump between logical, imaginative, and wild thinking
- **Build your knowledge and intuition base**
 - Learn how to research and visualize

IMPROVING CRITICAL THINKING

- **Use triggers**
 - Find the time and place that help you think best

GOOD CRITICAL THINKING

Focus On The Most
Relevant
Information

Ask The Right
Questions

Separate Facts
From Opinions And
Assumptions

Make Sound
Decisions

Set Priorities

Learn Quickly

Apply What They
Learn To New
Situations

PROBLEM SOLVING

- Critical Thinking is an **intentional** and **reflective** way of looking at things or circumstances, while Problem Solving focuses on a **specific situation**.

WHAT IS .. PROBLEM

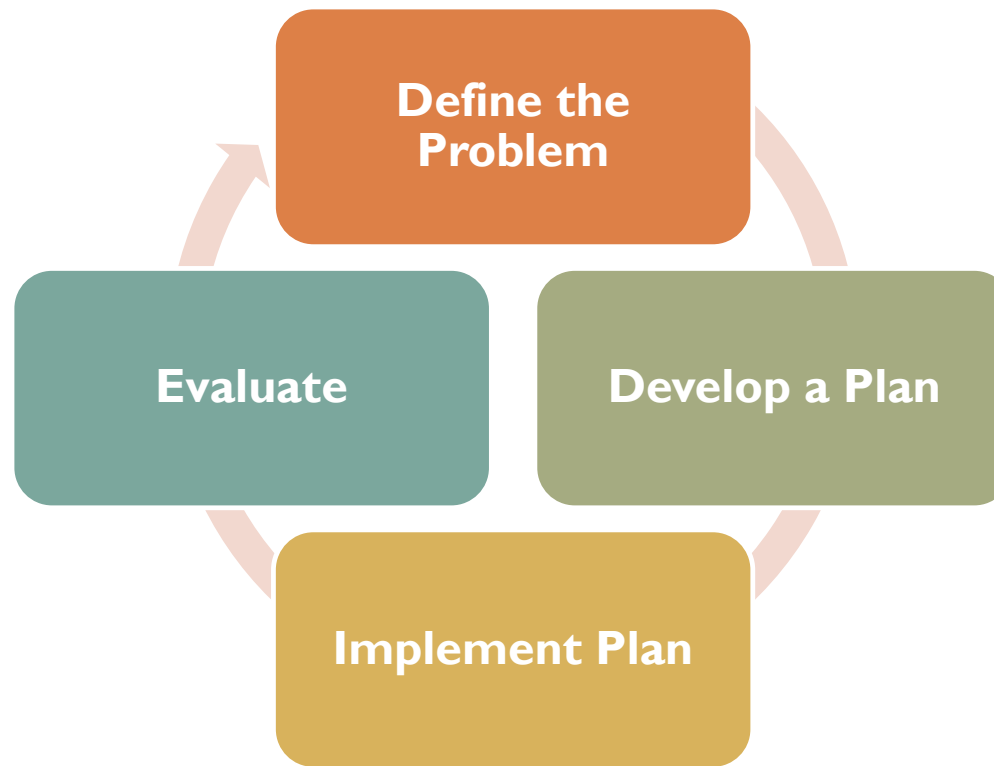
- A matter about which it is difficult to decide what to do.
- Any question or matter involving doubt, uncertainty, or difficulty.
- Any negative situation, issue, or matter that is unresolved.
- A question to be answered or solved.

WHAT IS .. PROBLEM SOLVING

- “Problem Solving is a **mental process** that involves discovering, analyzing and solving problems to overcome obstacles and find a solution that best resolves the issue.”

Henri Kaiser

PROCESS OF PROBLEM SOLVING



THE DECISION MAKING PROCESS



THE DECISION MAKING PROCESS

The situation

- Try and figure out exactly what your problem is, and write a problem statement.
- It helps to think of what you have but don't want, or what you want but don't have.

The causes

- Brainstorm all possible causes of the problem.
- Attempt to get to the very root cause.
- Use your inner child; keep asking “why?”

THE DECISION MAKING PROCESS

Possible solutions

- Once you've found the cause, think of all possible solutions.

Consequences

- Using your list of possible solutions, evaluate all the possible consequences of each solution.

THE DECISION MAKING PROCESS

The Solution

- Choose the best solution based on what is most practical.
 - Look at effectiveness.
 - How much risk does the proposed solution carry?
 - Does it fit within your budget?

Review Results

- Always check back to see how your solution is working,
 - Revise your plans as needed

DECISION MAKING CHECK LIST



Do I have all the information I need?

Have I considered all possible solutions?

Will my decision help me meet my goals?


DECISION MAKING CHECK LIST



Does it violate any of my values?

Have I considered all the consequences?

Can I live with the consequences?



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

Albert Einstein



THANK YOU

NEXT LECTURE: CREATIVE THINKING