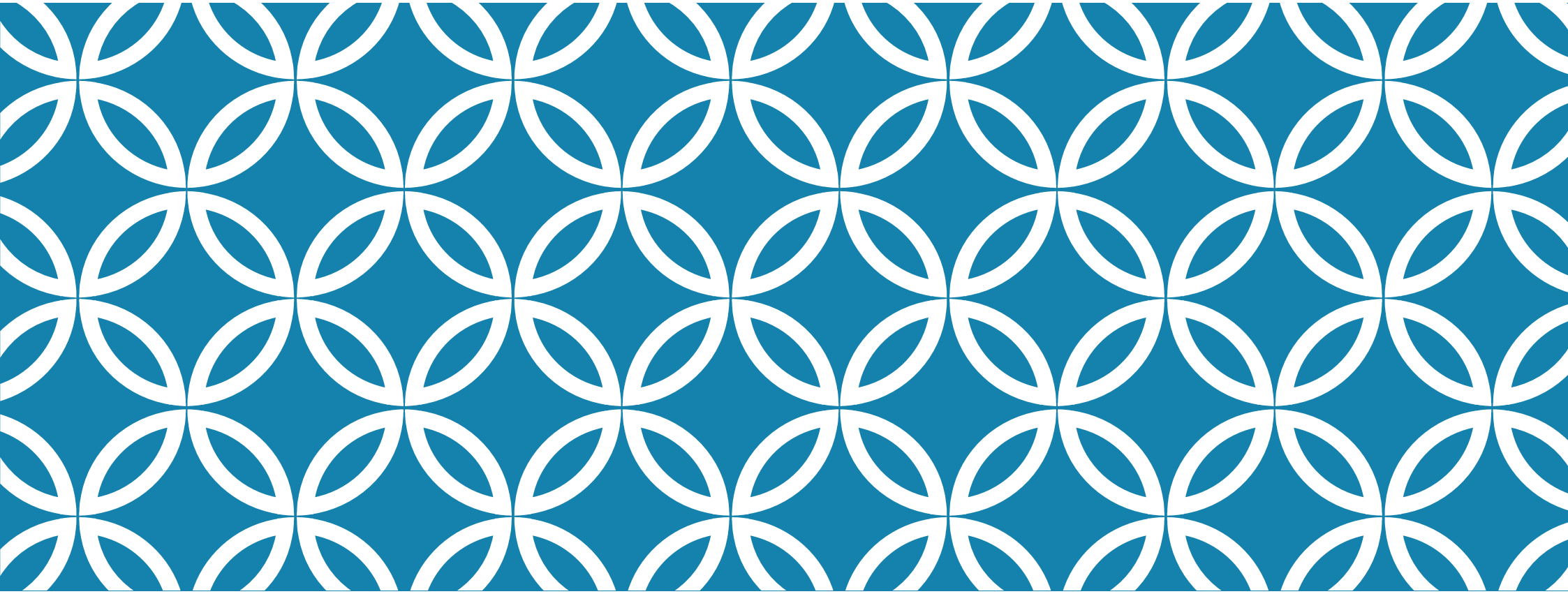


VALUE ENGINEERING LECTURE 4

Ahmed Elyamany

WORKSHOP (JOB PLAN) ACTIVITIES
CREATIVE PHASE

WORKSHOP (JOB PLAN) ACTIVITIES
CREATIVE PHASE

Purpose:

- Generate a quantity of ideas related to other ways to perform functions

Fundamental Question:

- How else may the functions be performed?

WORKSHOP (JOB PLAN) ACTIVITIES
CREATIVE PHASE

Common Activities:

- Conduct creative warm-up exercises
- Establish rules that protect the creative environment
  - **Tools:** Creativity "Ground Rules"
- Employ group idea stimulation techniques
- Generate alternate ideas that may improve value.
  - **Tools:** Brainstorming, Gordon Technique, Nominal Group Technique, TRIZ.

WORKSHOP (JOB PLAN) ACTIVITIES
CREATIVE PHASE

Typical Outcome:

- The team develops a broad array of ideas that provide a wide variety of possible alternative ways to perform the function(s) to improve the value of the project.

CREATION

There is an anecdote that the NASA took a decade and spent about **USD 12 million** to develop a pen which could be used for writing at zero gravity.

But the same problem was solved by Russia by using a pencil instead of the pen!

CREATION

Once Japan's biggest cosmetic company received a customer complaint that a soap box did not contain soap.

- Company engineers came out with a sophisticated **X-ray machine** which could detect empty boxes and was very costly.
- A small company employee came out with a solution to provide a **high speed fan**. If box was empty, the box would fly-off!

CREATION

- What other ways can we ?
  - Cut grass
  - Eliminate covering
  - Facilitate service
  - Protect user
  - Reduce effort

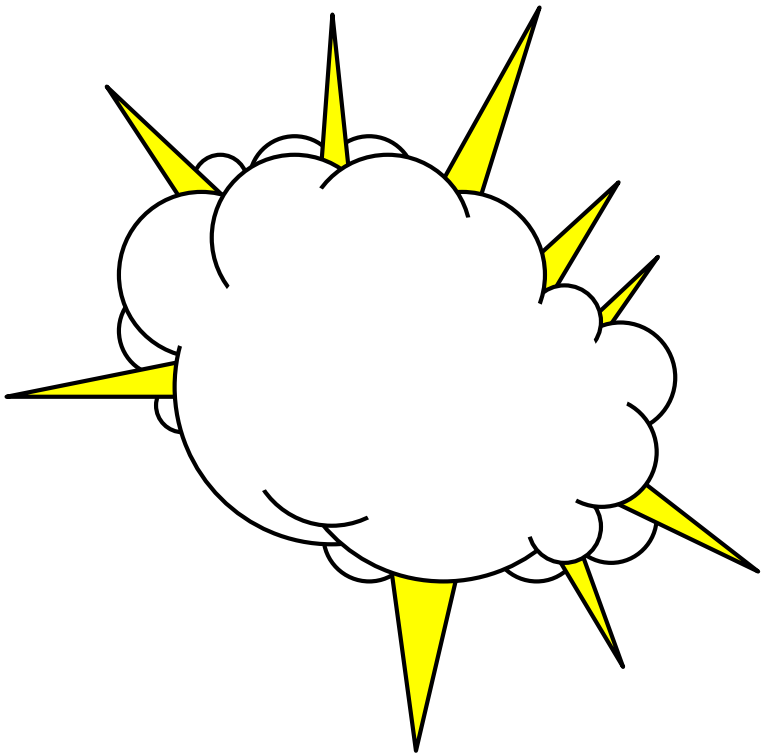
CREATION

- The mind is like a parachute - it works only when it's open!
- Retention
  - 10% what we hear
  - 20% what we see
  - 50% what we read
  - 90% what we do

CREATIVITY DEFINITION

- **Creativity** is the art of bringing something new into existence.

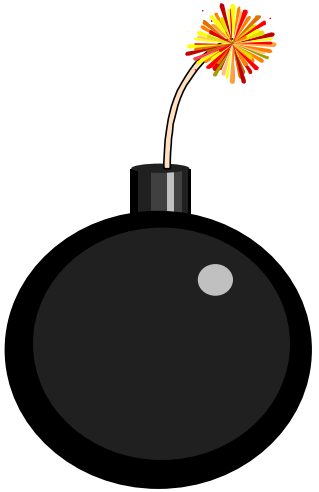
- It has the art of making, inventing, or producing something new and different.



CREATIVITY & INNOVATION RELATIONSHIP

- You must **blast** before you can create.
  - Blow apart the mistaken belief, skeptics, and nay-sayers.
  - Blow-up the rigid ideas and common theories of how things should be done.
  - Rather, **focus on possibilities**.

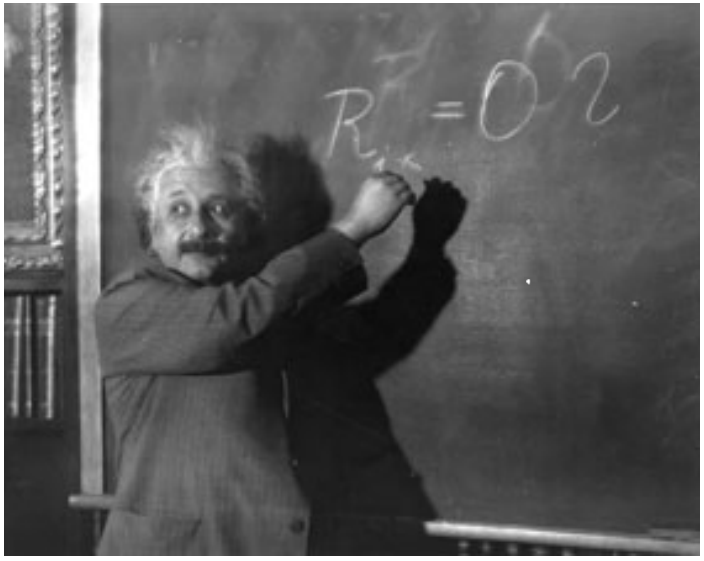
J. R. Wixson - 2004



IMAGINATION

Imagination is more important than **knowledge**, for knowledge is limited, while imagination holds the entire world.

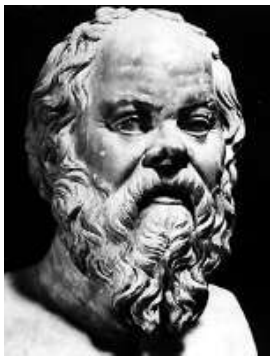
- **Albert Einstein**



THOUGHT FOR THE DAY:

When you always do what you have always done - you always get what you have always gotten.

- **Socrates**



IDEA VS. SOLUTION

- A **solution** requires justification & validation, and ***idea*** needs no justification.
- A **solution** is an end point, an ***idea*** is just the beginning.
- A **solution** is solid and self supporting, an ***idea*** is tender and must be built upon.

- ***DON'T KILL IDEAS WITH ROADBLOCKS!!***

PROBLEM SOLVING

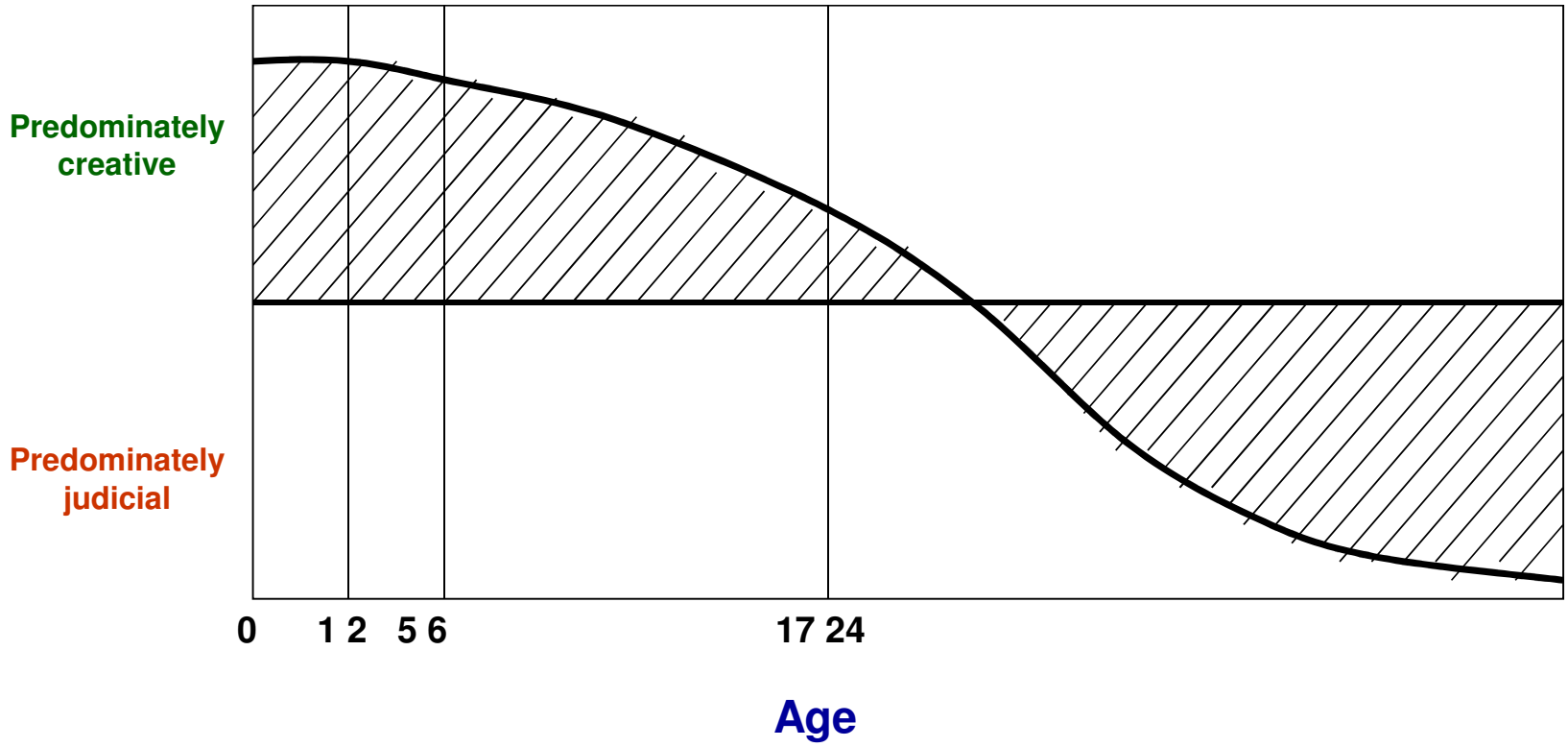
An organized effort for developing

UNIQUE and RELEVANT resolutions

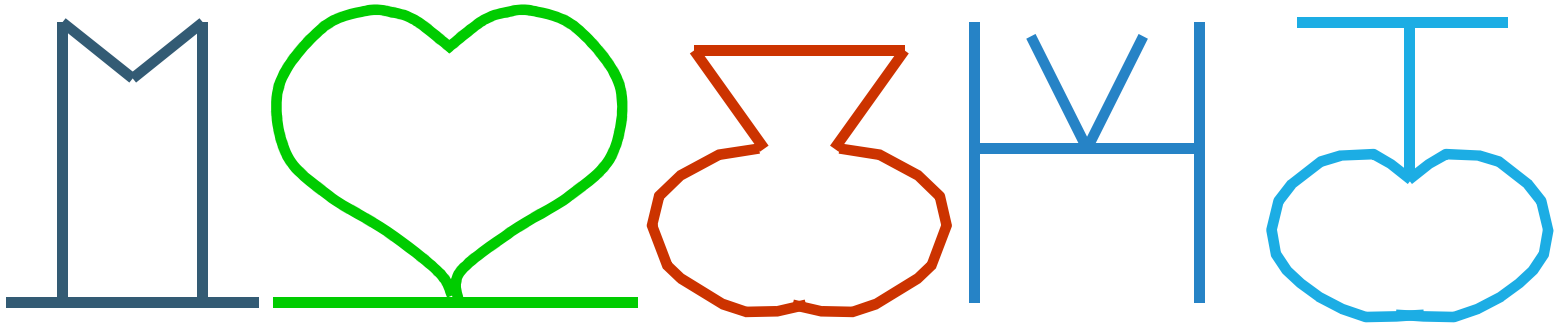
for

Opportunities or undesirable situations

CREATIVE AND JUDICIAL ABILITY DEVELOPMENT



WHAT IS THE NEXT SYMBOL IN SEQUENCE?



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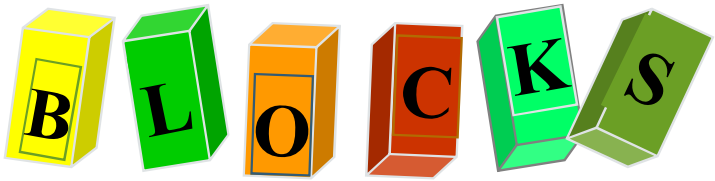
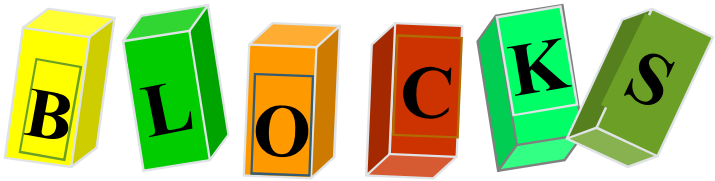


BLOCKS TO CREATIVITY

- The urge for creativity does not express itself because there exist certain blocks which restrain a person from becoming creative.
- These blocks are:

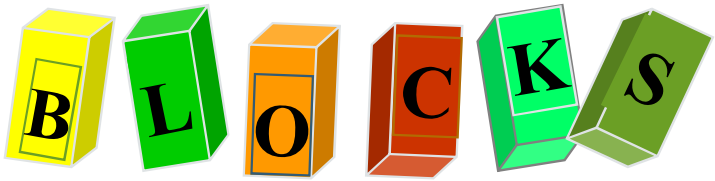
1) Habitual block
2) Perceptual block
3) Cultural block
4) Emotional block

BLOCKS TO CREATIVITY
HABITUAL BLOCK



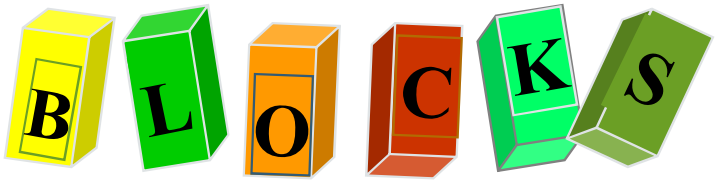
- From early childhood everybody has been put in a system.
- This system forces them to think in a certain pattern.
- They are so accustomed that they cannot come out of that pattern.
- They always get the same result which they got earlier.
- Fear of making mistakes
- Lack of positive approach.

BLOCKS TO CREATIVITY
PERCEPTUAL BLOCK



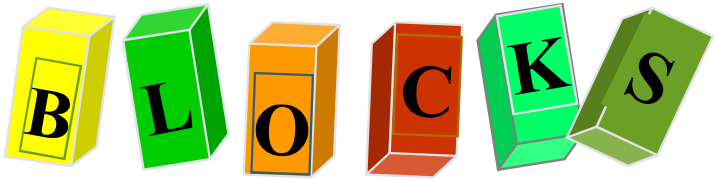
1. Failure to use all the senses of observation
2. Failure to investigate the obvious
3. Inability to define the problem
4. Difficulty in visualizing remote relationship
5. Failure to distinguish between cause and effect
6. Mental block

BLOCKS TO CREATIVITY
CULTURAL BLOCK



1. Lack of questioning attitude
2. Tradition
3. Having confidence and faith only in logical reasons
4. Desire to conform to a ‘proper’ pattern
5. Fantasy and intuition are waste
6. FEAR of the risk of pioneering

BLOCKS TO CREATIVITY
EMOTIONAL BLOCK



1. Fear of failure
2. Fear of criticism
3. Fear of taking risk
4. Failure to suspend judgment
5. The erroneous belief, “I am not a creative person”

CREATIVITY TECHNIQUES

- Brainstorming
- Gordon technique
- Nominal Group Technique
- TRIZ

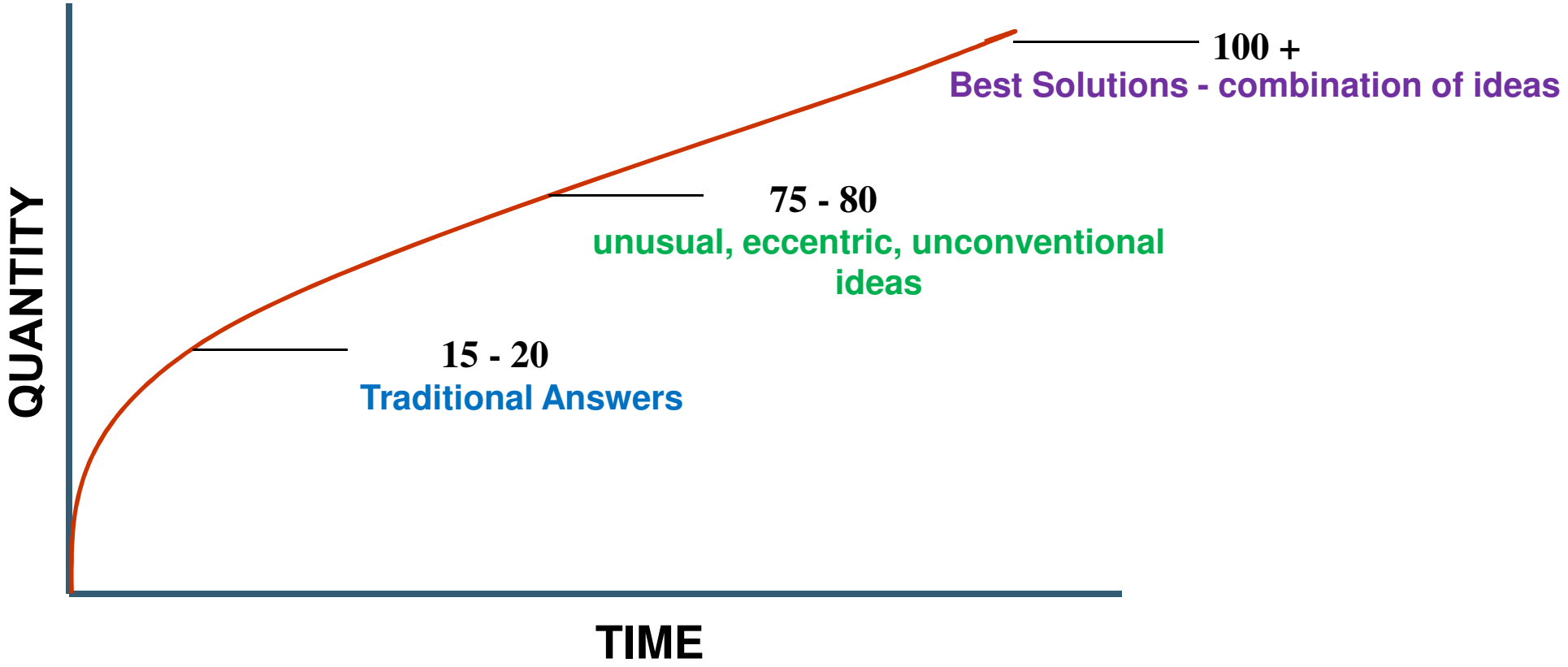
BRAINSTORMING

- The Brainstorming technique is widely used in the VE technique.
- This technique was developed by Alex Osbern; it is a group technique.
- The members of the group discuss among themselves and come out with various ideas to achieve the objective.
- The team should elect a leader who will facilitate the whole process.

RULES FOR BRAINSTORMING

- Generate a large number of ideas - quantity, not quality.
- Listen and improve on the ideas of others.
- Don’t criticize - No evaluation of ideas
- Encourage everyone to participate
- Record all ideas presented
- Time to let ideas “incubate” should be allowed.
- Select an appropriate meeting place

BRAINSTORMING CONCEPT



GORDON TECHNIQUE

- The idea behind this problem-solving technique is to encourage you to step as far away from a particular problem as possible. Developed by William Gordon
- For example, instead of asking, “How to we get our audiences to spend another £2 each per visit,” you might ask the following steps:

GORDON TECHNIQUE

1) **"How do we make our audiences happy?"**
2) After exploring this question in a little more detail you might ask, **"How can we provide good customer service?"**
3) Once answers to that question have finished you would get more specific still, **"What do our audiences want from our program?"**
4) Finishing with your original question, **"How to we get our audiences to spend another £2 each per visit?"**

NOMINAL GROUP TECHNIQUE

NGT is a structured variation of a small-group discussion to reach consensus.

NGT gathers information by asking individuals to respond to questions posed by a moderator, and then asking participants to prioritize the ideas or suggestions of all group members.

The process prevents the domination of the discussion by a single person, encourages all group members to participate, and results in a set of prioritized solutions or recommendations that represent the group's preferences.

NOMINAL GROUP TECHNIQUE
FOUR STEP PROCESS TO CONDUCT NGT

1) Generating Ideas
2) Recording Ideas
3) Discussing Ideas
4) Voting on Ideas

NOMINAL GROUP TECHNIQUE
1) GENERATING IDEAS

- The moderator presents the question or problem to the group in written form and reads the question to the group.
- The moderator directs everyone to write ideas in brief phrases or statements and to work silently and independently.
- Each person silently generates ideas and writes them down.

NOMINAL GROUP TECHNIQUE
2) RECORDING IDEAS

- Group members engage in a session to concisely record each idea (without debate at this point).
- The moderator writes an idea from a group member on a flip chart that is visible to the entire group, and proceeds to ask for another idea from the next group member, and so on.
- There is no need to repeat ideas; however, if group members believe that an idea provides a different emphasis or variation, feel free to include it.
- Proceed until all members' ideas have been documented.

NOMINAL GROUP TECHNIQUE
3) DISCUSSING IDEAS

- Each recorded idea is then discussed to determine clarity and importance.
- For each idea, the moderator asks, "Are there any questions or comments group members would like to make about the item?" This step provides an opportunity for members to express their understanding of the logic and the relative importance of the item.
- The creator of the idea need not feel obliged to clarify or explain the item; any member of the group can play that role.

NOMINAL GROUP TECHNIQUE
4) VOTING ON IDEAS

- Individuals vote privately to prioritize the ideas.
- Identify the ideas that are rated highest by the group as a whole.
- The moderator establishes criteria used to prioritize the ideas.
- To start, each group member selects the five most important items from the group list and writes one idea on each index card.
- Next, each member ranks the five ideas selected, with the most important receiving a rank of 5, and the least important receiving a rank of 1.

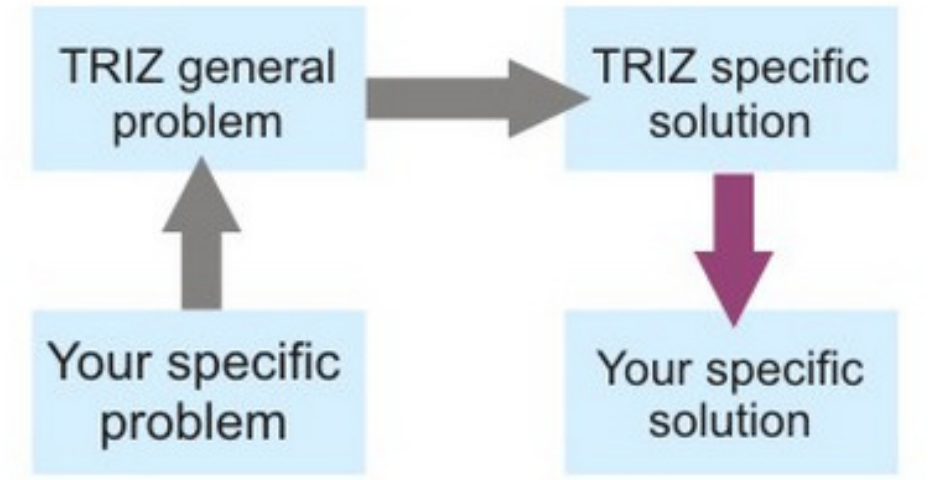
TRIZ

- "TRIZ" is the (Russian) acronym for the "Theory of Inventive Problem Solving."
- TRIZ is a problem solving methodology based on logic, data and research, not intuition.
- It draws on the past knowledge and ingenuity of many thousands of engineers to accelerate the project team's ability to solve problems creatively.
- As such, TRIZ brings repeatability, predictability, and reliability to the problem-solving process with its structured and algorithmic approach.

TRIZ

The "General TRIZ Solutions" referred to in Figure 1 have been developed over the course of the 65 years of TRIZ research, and have been organized in many different ways.

Figure 1: The TRIZ Problem-Solving Method

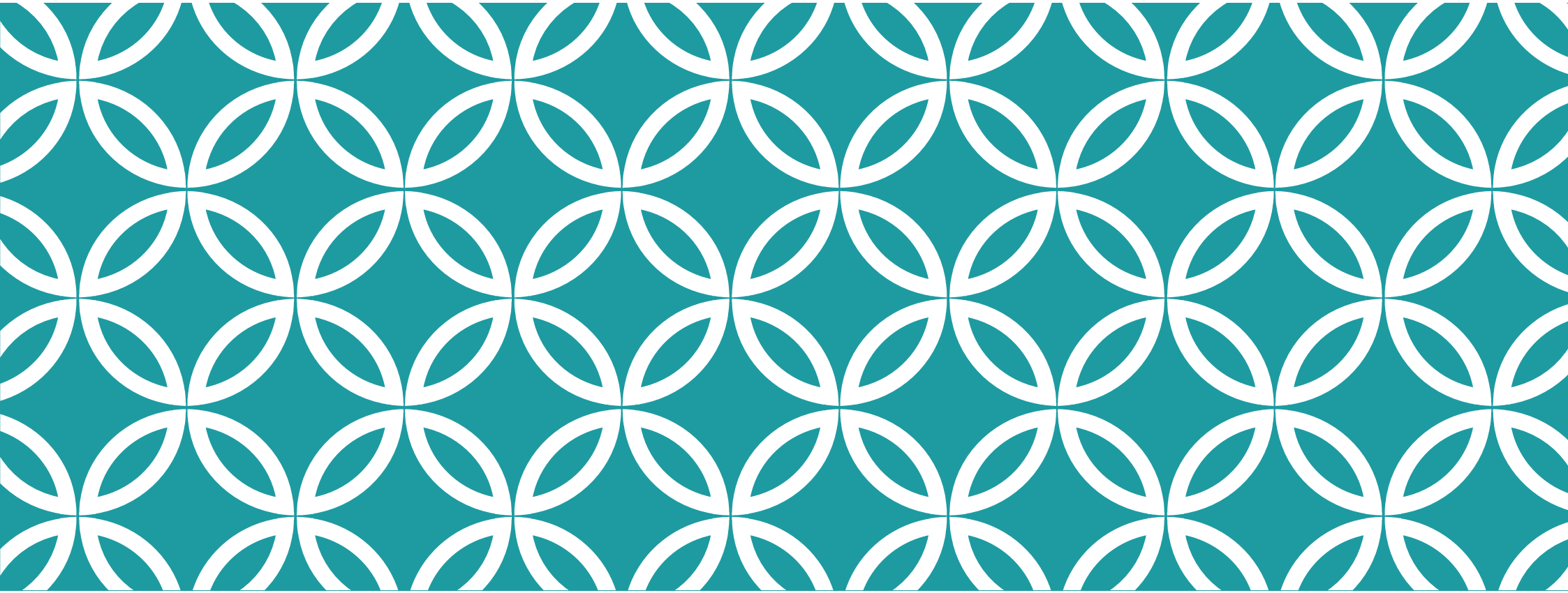


TRIZ

The best way to learn and explore TRIZ is to identify a problem that you haven't solved satisfactorily and try it.

Use the List of the 40 Principles of Problem Solving and the Contradiction Matrix tool that can be found at :

http://www.triz-journal.com/40-inventive-principles-examples/



THANKS FOR LISTENING