



# Outcome Oriented Teaching Learning Methodology

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# Objective:

- ▶ Different existing teaching learning methodologies
  - ▶ Traditional classroom teaching
  - ▶ Chalk and desk Methodology
  - ▶ E-Learning
  - ▶ Social Network in teaching learning
- ▶ The objective of the current topic is to focus on new teaching learning methodologies
  - ▶ Student centered teaching
  - ▶ Interactive teaching learning sessions
  - ▶ Problem solving pedagogy
  - ▶ Analogy with specific outcomes



# Teaching Learning Strategy

- ▶ It is scientifically proven that Human brain can not focus on one topic not more than 15 minutes
- ▶ The session must include internal shift of teaching strategies to break monotonous session.
- ▶ Involvement of the learner in teaching learning.

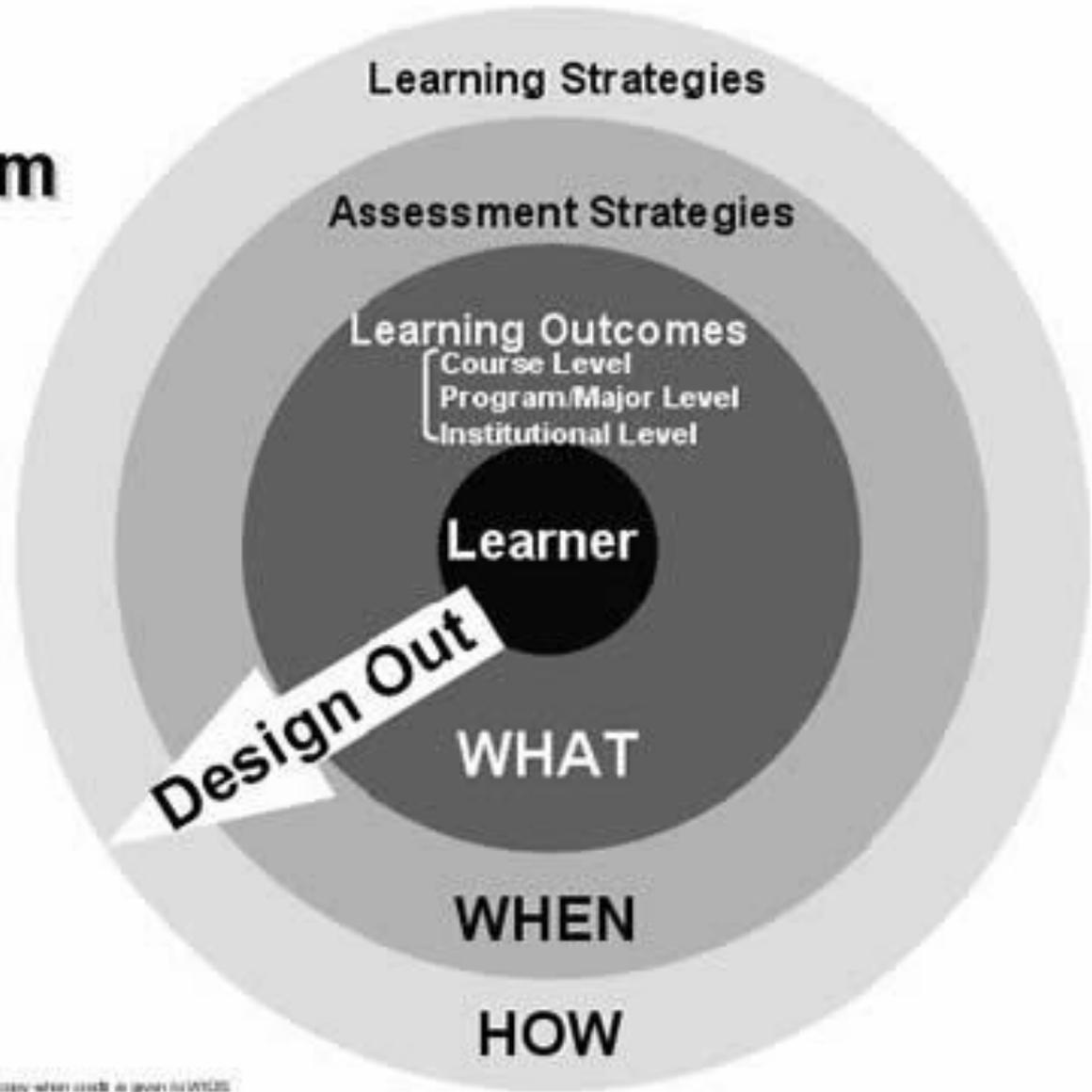


# Pedagogic Techniques

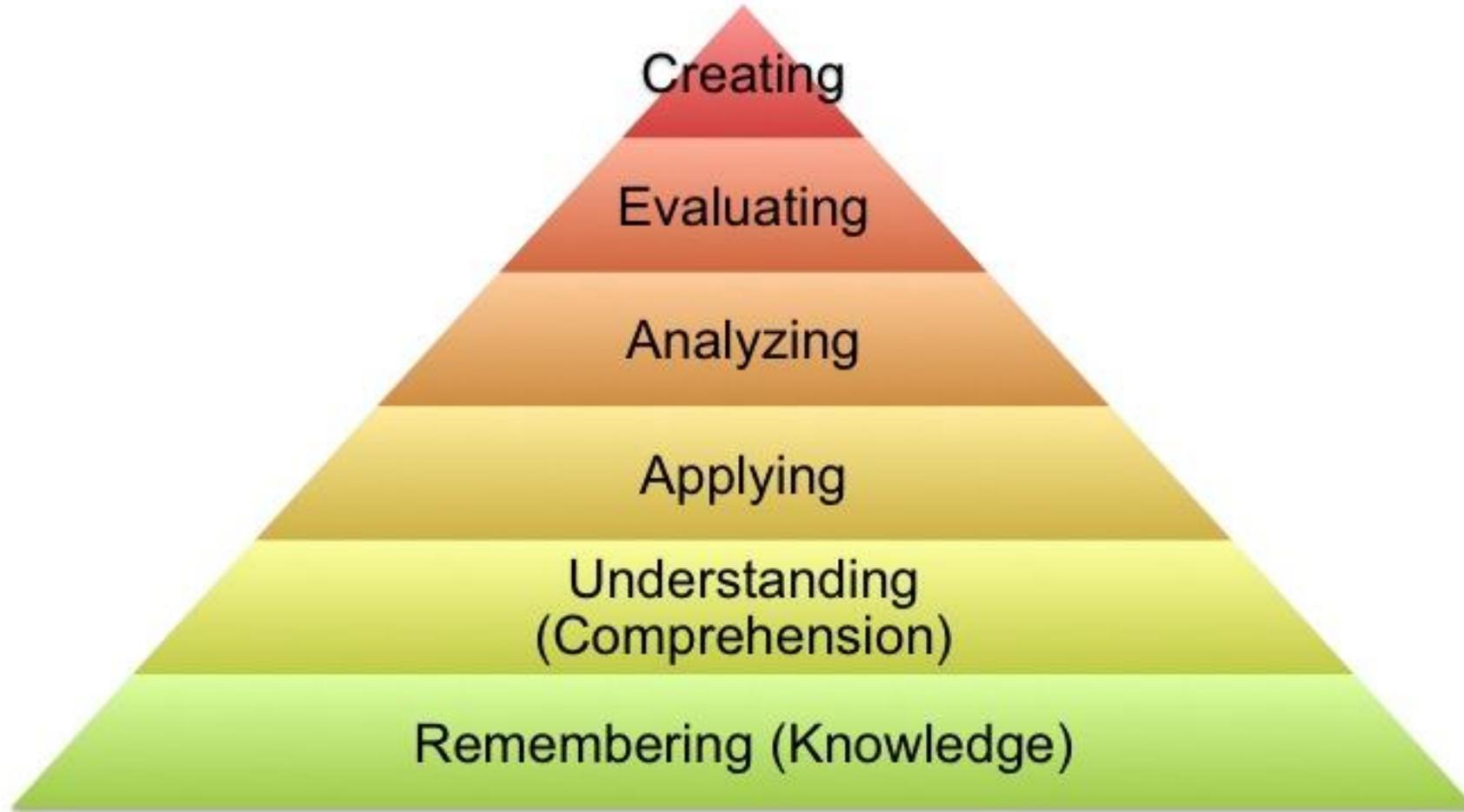
- Various methods, like Brainstorming and Puzzles, can be used in order to impart effective teaching and ensure active participation of learners in the classroom.
- **Each method, in turn, has numerous techniques and variations which will enable learners achieve different knowledge levels of **Blooms Taxonomy** and **Gardener's Multiple Intelligence**.**
- The following table can be used as a **quick reference** to select appropriate pedagogic techniques.

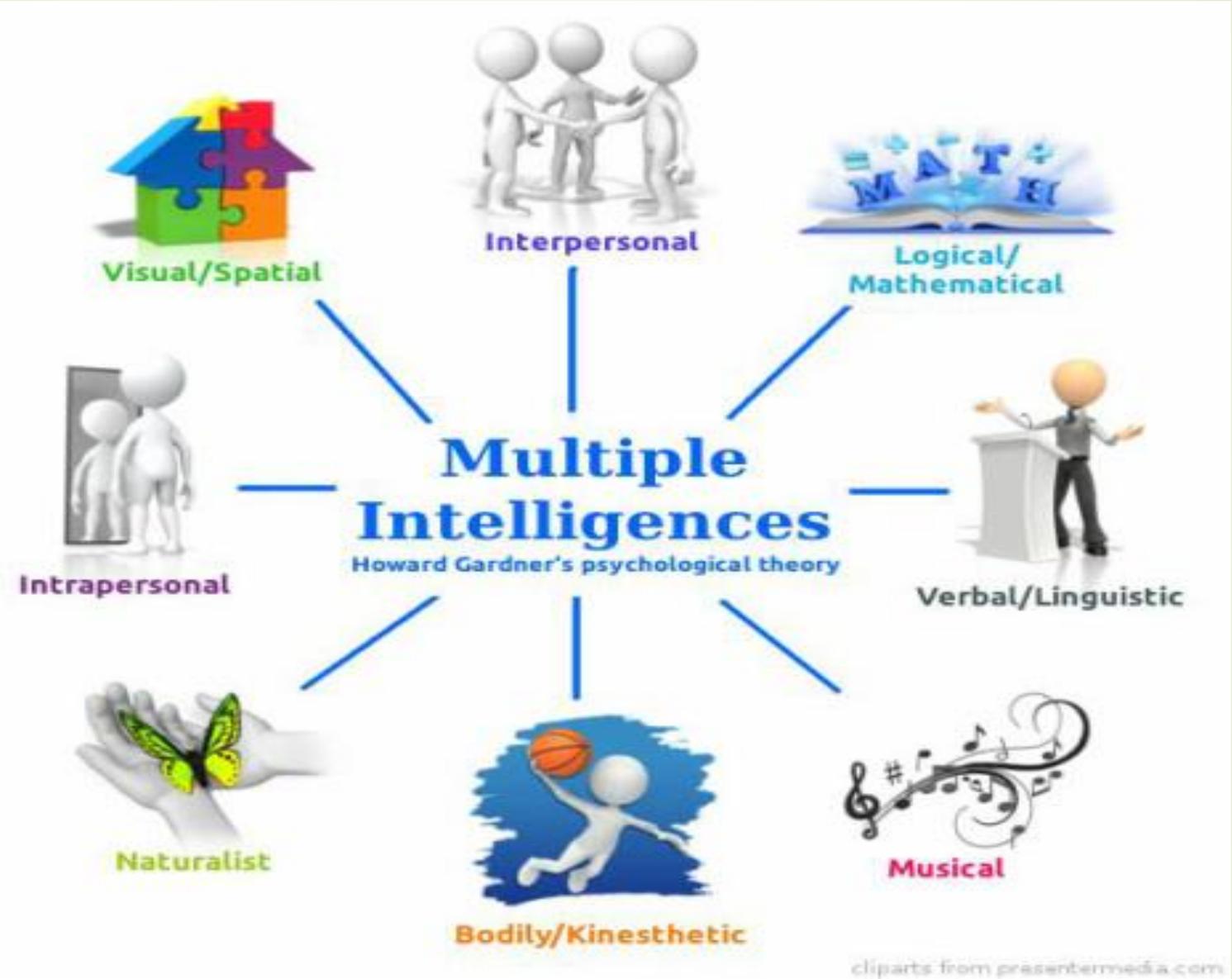
# Aligned Curriculum

**Educators**  
Begin with the end in mind as they design learning.



# Bloom's Taxonomy







# Pedagogic Methods

- Brainstorming
- Innovative Introduction
- Mnemonic Instruction
- Puzzles
- Questioning Skills
- Quiz
- Role Play
- Seminar
- Case Study
- Demonstration
- Games
- Group Discussion
- Impersonation
- Innovation conclusion
- e-Learning



# Brainstorming

## Overall Objectives of Brainstorming

To generate large number of creative ideas.

- To introduce innovation in application.
- To encourage self learning.

## Types of brainstorming

1. **Individual Brainstorming:** This involves allotting a task/theme and asking people to work on it individually. The individual ideas are then consolidated.
2. **Group Brainstorming:** In this method, group/s consisting of at least eight participants is formed for a said task/theme (this is a more prevalent form of brainstorming).

Method	Techniques	Blooms Level	Intelligence Level
Brainstorming	Problem Solving	Remembering/ Knowledge Analysis Application	Mathematical -Logical Interpersonal Intrapersonal
	 Model Making	Understanding/ Comprehension Application	Mathematical -Logical Interpersonal Linguistic
	Simplification	Understanding/ Comprehension	Mathematical -Logical Interpersonal

# Brainstorming Techniques

## Problem Solving

### Procedure

- Form 4 to 5 groups of learners
- Present the problem to the groups with a brief explanation of the problem.
- Ask Groups to come up with different ways of resolving the given problem within the stipulated time, and present their solutions.
- Begin the process of brainstorming for generating ideas
- Encourage/create space to generate wild ideas
- Avoid criticism of ideas put forth by participants during brainstorming session.
- Focus on quantity. Primary function of brainstorming is to generate large number of ideas.
- Select ideas that are relevant, appropriate, applicable and creative.
- Integrate the ideas, improvise and reach a conclusion regarding what could be the most appropriate solution.

Specific Objectives	<input type="checkbox"/> To understand fundamental concepts/theories in unconventional/novel ways <input type="checkbox"/> To assess the level of learning of the learners in the classroom
Application Areas	As a closure activity towards the end of the lesson
Facilitator's role	Designs a Problem (mathematical/mechanical etc) Facilitates the brainstorming session Helps learners arrive at a solution or solutions Ensures the involvement of the entire class
Learner's role	Forms groups to find out different ways of solving the problem within the theoretical framework Actively participates in the brainstorming session One learner records all the ideas generated.
Blooms Taxonomy Learning levels Achieved	<b>Understanding</b> <b>Analysis</b> <b>Application</b>
Multiple Intelligence Levels Developed	<b>Mathematical-Logical</b> <b>Interpersonal</b> <b>Intrapersonal</b>



## E –Learning:

The use of technology provides a range of possible learning experience which is difficult to achieve in the face-to-face classroom. There is a wide range of activities of different levels of sophistication, ranging from as simple as email question and answers, or online forums to highly sophisticated simulations.

# Session Plan for teaching-learning methodology of Dijkstra Algorithm

<b>Session Name:</b>	<b>Dijkstra Algorithm</b>
<b>Author Name:</b>	<b>SUNIL SHARMA</b>
<b>Department:</b>	<b>MATHEMATICS</b>
<b>Number of students in the class:</b>	<b>60</b>
<b>Subject/Course:</b>	<b>Graph Theory</b>

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## SESSION OBJECTIVES

### AT THE END OF THIS SESSION, THE LEARNER WILL BE ABLE TO:

- ✚ Define Minimum Spanning Tree (MST) & Shortest Path Problem (SPP).
- ✚ Differentiate between MST and SPP
- ✚ Explain the Steps of Dijkstra Algorithm
- ✚ Calculate the shortest path from the source vertex.
- ✚ Apply the concept of single source shortest path algorithm in real life problems e.g. Airline flight times, Computer networks response times etc.

Time (in min)	Content	Learning Aid and Methodology	Faculty Approach	Typical Student Activity	Learning Outcomes (Blooms + Gardeners)
10	MST & SPP	Analogy, PPT	Explain	Listens	<b>Understanding</b> linguistic Intrapersonal
15	Dijkstra Algorithm	Chalk and Talk, Chart Presentation	Explain	Listens & Analyse	<b>Understanding</b> Intrapersonal Logical
15	Demonstration of Dijkstra Algorithm	Role play	Facilitates	Participates, Observes	<b>Understanding, Applying</b> Linguistic Intrapersonal, interpersonal
10	Application of Dijkstra Algorithm	Prototype Model, Chart	Demonstrates	Listens, Calculates Interprets	<b>Understanding, Applying Analyzing</b> Intrapersonal, Spatial Logical
5	Conclusion	Rapid Fire	Facilitates Questions	Answers	<b>Remembering, Understanding</b> Interpersonal, Mathematical & Logical Linguistic



## **SESSION SUMMARY:**

**AT THE END OF THIS SESSION THE LEARNER WILL BE ABLE TO:**

- Explain MST & SPP**
- Concept of Dijkstra algorithm**
- Identify and illustrate the conditions of Dijkstra algorithm**
- Analyse the cost of various paths from the source vertex**
- Application of Dijkstra algorithm**

# Background

Learners found difficulty to understand the Dijkstra algorithm as in the selection of the node and the conversion of temporary node to permanent node by connecting with right edge. Which is difficult to understand through traditional chalk and Board approach of learning? To understand this concept I have given a task to learners to make a role play to define the Dijkstra algorithm involving the maximum students of class. The role of the other group of participant was to give the values to the nodes and uses ropes in place of edges with assigning direction and nonnegative weights to decrease the complexity for better understanding apart from this the prototype model is used to give students better vision and clarity.

## CHALLENGES IN IMPLEMENTATION

Session plan took more time and effort for preparation. The development of new and innovative approach for this topic. Session plan should build such that the students get the practical approach over it. Time Management was a challenge as the activity was dynamic in nature. Active participation from the learners as they are not habitual of doing such activity and role play was a new activity for them.

## LEARNING OUTCOMES ACHIEVED BY LEARNERS

Found Dijkstra algorithm learning very interesting and easy.

Participated actively.

Improvement in analytical skills.

Interpersonal, Intrapersonal, visual and linguistic skills improved.

Teaching paradigm shifted from faculty to learners.

The learners themselves formed the group and conducted the activity and hence paradigm shift was there.

### LEARNERS FEEDBACK

Understanding the algorithm very interestingly.

Found learning in the class very interesting.

Found digital and circuit representation effective.

Happy to have a lively classroom environment as they had fun with study.

Found the role play very effective.

**ANY EXTRA INPUTS (Please fill in the Box below)**

✚ Board and Chalk

✚ Analogy

✚ Role Play

✚ Prototype Model

# Analogy Discussion



# Role Play



# Prototype Model:





*Thanks*