

Course 7a

Method- Physical Science

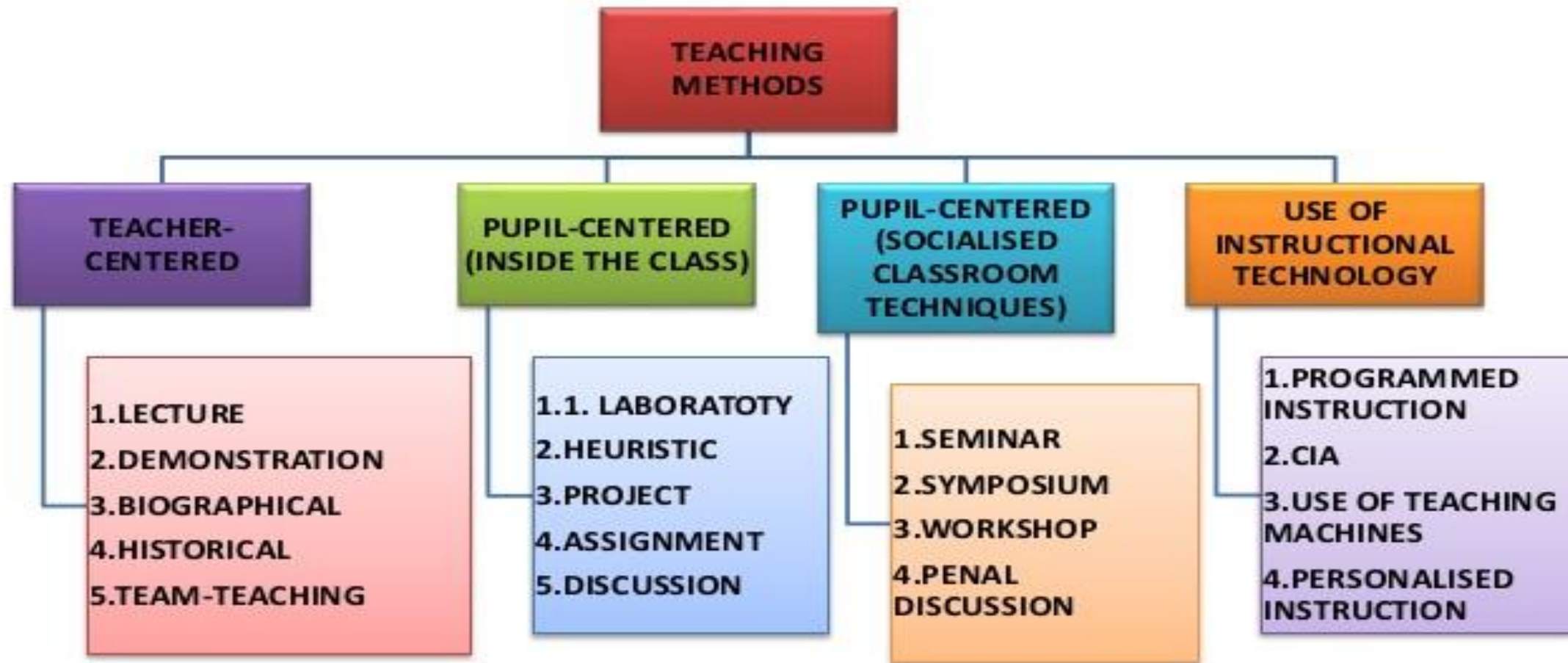
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Introduction

- **Teaching methods** denote various strategies that the **teacher** uses to deliver his/her subject matter to the students in the classroom based on the instructional objectives to bring about learning. **Teaching methods** aids learning and help to communicate ideas and skills to the students.

TEACHING METHODS



Importance of teaching methods

- Every teacher develops a particular way of going about the complex task of **teaching**. are expected to assist each other during the **teaching** and learning process . The logical and proper relationship and friendship of **teachers'** ratio with their students' achievement and retention of learning should be considered too.
- The **importance of using varied methods and strategies** is to facilitate the learning of all students. This means we have to cultivate the lessons in a sense of manner in instruction that successfully challenge every student to participate in the discussion.

THE LECTURE METHOD



- **Lecture method** is the oldest method of teaching.
- It is based on the philosophy of idealism.
- This **method** refers to the explanation of the topic to the students. Teachers are more active and students are passive but the teacher also asks questions to keep the students attentive.
- A formal or semi-formal discourse is which the instructor presents a series of events, facts, or principles, explores a problem, or explains relationships.

Uses

- To orient students.
- To introduce a subject.
- To give directions on procedures.
- To present basic material.
- To introduce a demonstration, discussion, or performance.
- To illustrate application of rules, principles, or concepts.
- To review, clarify, emphasise or summaries.

Advantages

- Saves time.
- Permits flexibility.
- Requires less rigid space requirement.
- Permits adaptability.
- Permits versatility.
- Permits better centre over contact and sequence.

Dis-Advantages

- Involves one-way communication.
- Poses problems in skill teaching.
- Encourages student passiveness.
- Poses difficulty in gauging student reaction.
- Require highly skilled instructors.

Demonstration Method



- Carlito Manansala Jr.

- The word demonstration means to give demos or to perform the particular activity or concept.
- In demonstration method, the teaching-learning process is carried in a systematic way.
- Demonstration often occurs when students have a hard time connecting theories to actual practice or when students are unable to understand applications of theories

Characteristic of demonstration method

- (1) The demonstration should be done in a simple way.
- (2) In this strategy, attention is paid to all students.
- (3) Goals and objections of demonstration are very clear.
- (4) It is a well-planned strategy.
- (5) Time is given for rehearsal before the demonstration.

Merits of demonstration method

- (1) It helps a student in having a deeper understanding of the topic.
- (2) It helps students remain active in teaching -learning process.
- (3) It leads to permanent learning.
- (4) It accounts for the principles of reflective thinking.
- (5) It helps to create interest for topics among students.
- (6) It helps in arousing the spirit of discovery among students.
- (7) It imparts maximum learning to students.

Demerits

- (1) Students can not benefit with direct and personal experiences as teacher carry out the demonstration.
- (2) It can be costly as it requires costly materials.
- (3) It can be a time-consuming method.
- (4) It is not based on learning by doing.
- (5) This method does not provide training for the scientific method.
- (6) There is a lack of experienced teachers to carry out the demonstration.

LECTURE-CUM- DEMONSTRATION METHOD



- It is one of Traditional method. this is also known as Chalk and talk method. Teacher centered method. In this method Teacher is active and learners are passive. the essentials qualities in learning science such as independent thinking, power of observation and reasoning can be developed in this method.

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The teacher perform the experiment in the class and goes on explain what he does. here the students see the actual apparatus and operation and help the teacher in demonstrating the experiment. This method works on the principles of concrete to abstract, and learning by doing.

Criteria of a good lecture demonstration method

- 1. the demonstration should be planned and rehearsed well in advance. planning and rehearsing of the experiment is very essential for it gives confidence in the demonstrator. he find out the difficulties involved in the experiment. so that the lesson will go smoothly and systematically.
- 2. the teacher should be clear of the purpose of demonstration. he should know the aims and objectives of the demonstration.
- 3. demonstration should be the result of the active participation of pupils and teacher. teacher help the students in arranging and fitting and performing the experiment.

Characteristics of good demonstration

- Visibility
- One major idea at a time
- Clear cut
- Convincing
- Rehearsal

- Supplemented with other teaching aids
- Asking relevant questions
- Neat, clean and tidiness
- Simple and speedy
- To write observation
- Teacher to act as performer
- Sufficient time

Advantages of Lecture-cum-Demonstration Method

- Save time and money.
- Student participation.
- Helpful to promote useful discussion.
- More efficient method
- Activity method
- Helpful for teacher

Disadvantages of Lecture-cum-demonstration Method

- **Visibility:** Visibility is main problem for a teacher because all the students may not be able to see the details and results of a demonstration
- **Speed of experiment:** Either too fast or too slow speed of demonstration sometimes may create trouble
- **Ignore individual difference**
- **This method somehow hinder the development of laboratory skills among the students**
- **Not useful for developing scientific attitude**

Heuristic Method of teaching शिक्षण की खोज विधि

Thumbnail Maker

- A **heuristic technique** (Ancient Greek word: "find" or "discover"), or a *heuristic*, is any approach to problem solving or self-discovery that employs a practical method that is not guaranteed to be optimal, perfect or rational, but which is nevertheless sufficient for reaching an immediate, short-term goal.
- Where finding an optimal solution is impossible or impractical, heuristic methods can be used to speed up the process of finding a satisfactory solution.
- Heuristics can be mental shortcuts that ease the cognitive load of making a decision

Its basic principles are:

- To develop problem solving attitude
- To develop scientific attitudes towards the problem
- To develop power of self-expression
- To teach as little as possible at one time
- To encourage learner to learn himself as much as possible

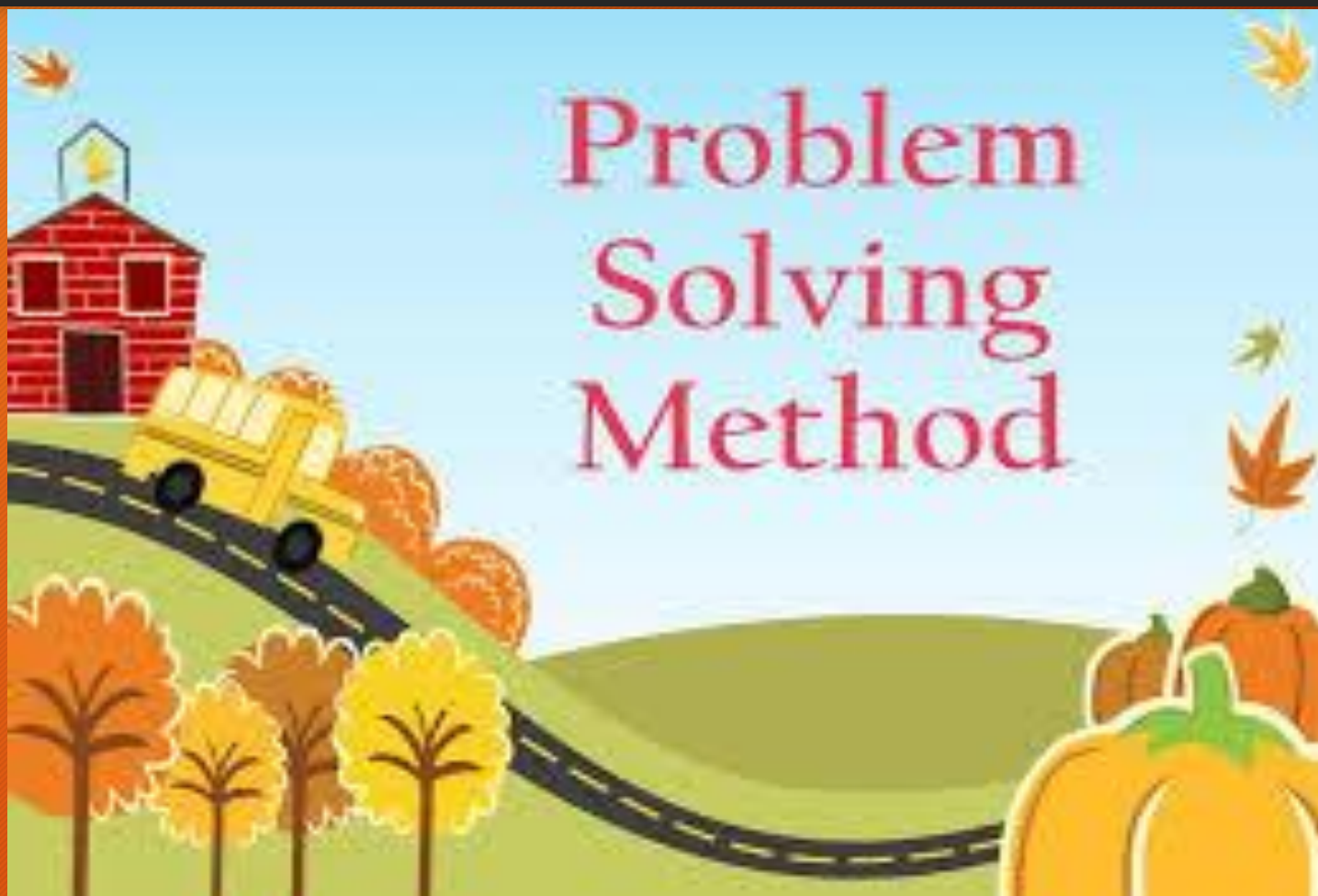
Advantages of Heuristic Teaching Method

- It helps in achieving cognitive, affective and psychomotor objectives i.e. it helps in all round development of the child.
- Students are put into the situation to learn by self-experience. It certainly develops self-confidence and self-reliance in the learners.
- It helps in developing scientific attitude and creativity in the learners.
- Teacher encourages the learners to explore the environment in search of the solution of the problems. By doing so, some new knowledge is discovered by them.
- Teacher is always ready to provide individual guidance regarding the solution of the problem. Thus interaction between the teacher and the learner takes place in a cooperative, conducive environment.

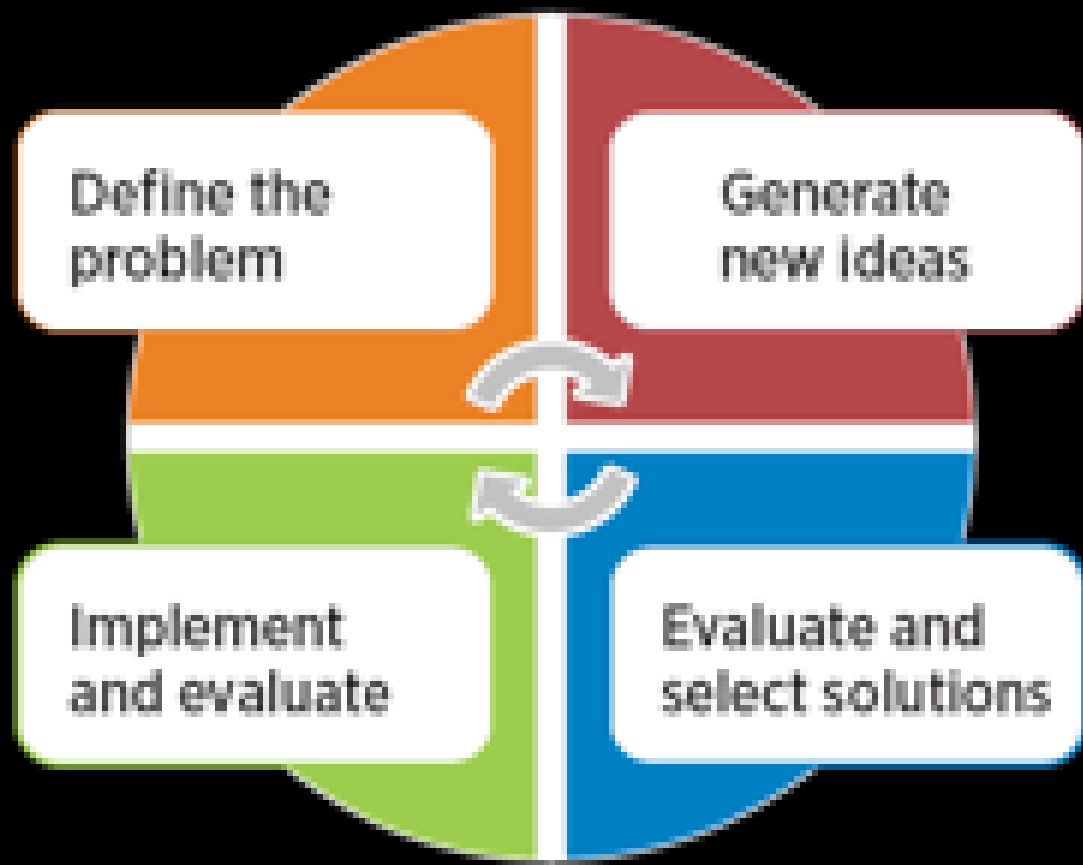
Disadvantages of Heuristic Teaching Method

- It cannot be used at primary level of education
- Higher intelligence and divergent thinking is required in the learners. But, there are some students who are below average and fail to succeed in discovering the solutions of the problems. It frustrates them.
- In true sense, none of the teachers have patience for providing individual guidance to the learners. And learners, too, feel hesitation to approach the teacher for seeking his help.

Problem Solving Method



- **Problem solving** is the act of defining a **problem**; determining the cause of the **problem**; identifying, prioritizing and selecting alternatives for a solution; and implementing a solution.
- **Problem-solving method** aims at presenting the knowledge to be learnt in the form of a **problem**.



Characteristics of Problem Solving

- They have an “attitude”! ...
- They re-define the **problem**. ...
- They have a **system**. ...
- They avoid the **experience trap**. ...
- They consider every position as though it were their own. ...

- They recognize conflict as often a prerequisite to solution. ...
- They listen to their intuition.
- They invariably go beyond “solving the problem”.
- They seek permanent solutions.
- They gain agreement and commitment from the parties involved.

Advantages of problem solving method

- The open-ended nature of **problem solving** allows high achieving students to extend the ideas involved to challenge their greater knowledge and understanding.
- **Problem solving** develops mathematical power.
- It gives students the tools to apply their mathematical knowledge to solve hypothetical and real world **problems**.

Disadvantages of problem solving method

- It takes too much time.
- It is not possible to apply this method to all disciplines.
- It can load worldly furference to students.
- It can be difficult for students to provide the materials and sources which is required for solving the problem.
- Evaluting the learning can be difficult.

PROGRAMME

INSTRUCTION



By: firoz qurabi

- **Programmed instruction** is a method of presenting new subject matters to students in a graded sequence of controlled steps. Students work through the **programmed** material by themselves at their own speed and after each step test their comprehension by answering an examination question or filling in a diagram.
- Program instruction method of teaching is an autocratic and individualized strategy. It is based on psychological principles of operant condition. The response of the learner are strictly controlled by the programmer.

Types of Programmed Instruction

- There are three types of this teaching strategy
- **Linear Programming.** It is being used for teaching all subjects. In programmed teaching strategy progressive chain elements are presented. Last step is at the mastery level. It is based on five fundamental principles.
- Small steps
- Active responding
- Immediate confirmation
- Self-pace
- Student testing

- **Branched Programming.** It is generally used in mechanical fields.
- **Mathematics.** Retrogressive chain of elements is presented. First step is the master level while the last step is the simplest element.

CHARACTERISTICS

- The subject matter is broken down in to small steps called FRAMES and arranged sequentially.

Frequent response of the student is required.

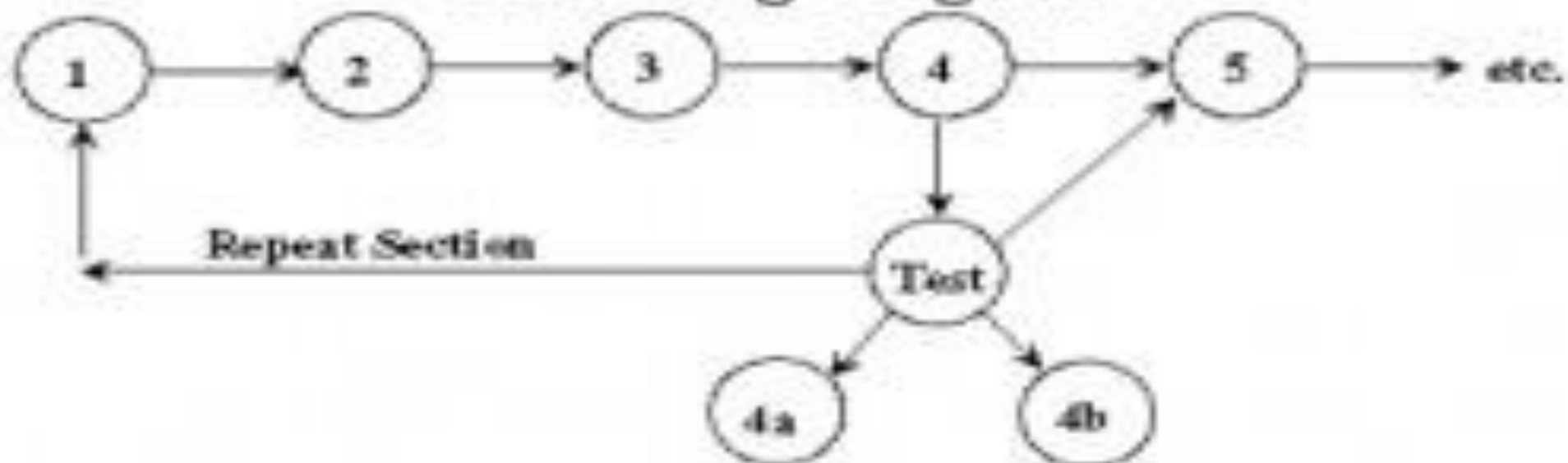
- . There is an immediate confirmation of the right answer or correction of wrong answers given by the learners (SELF CORRECTING FEATURE)

TYPES OF PI

Linear Program



Branching Program



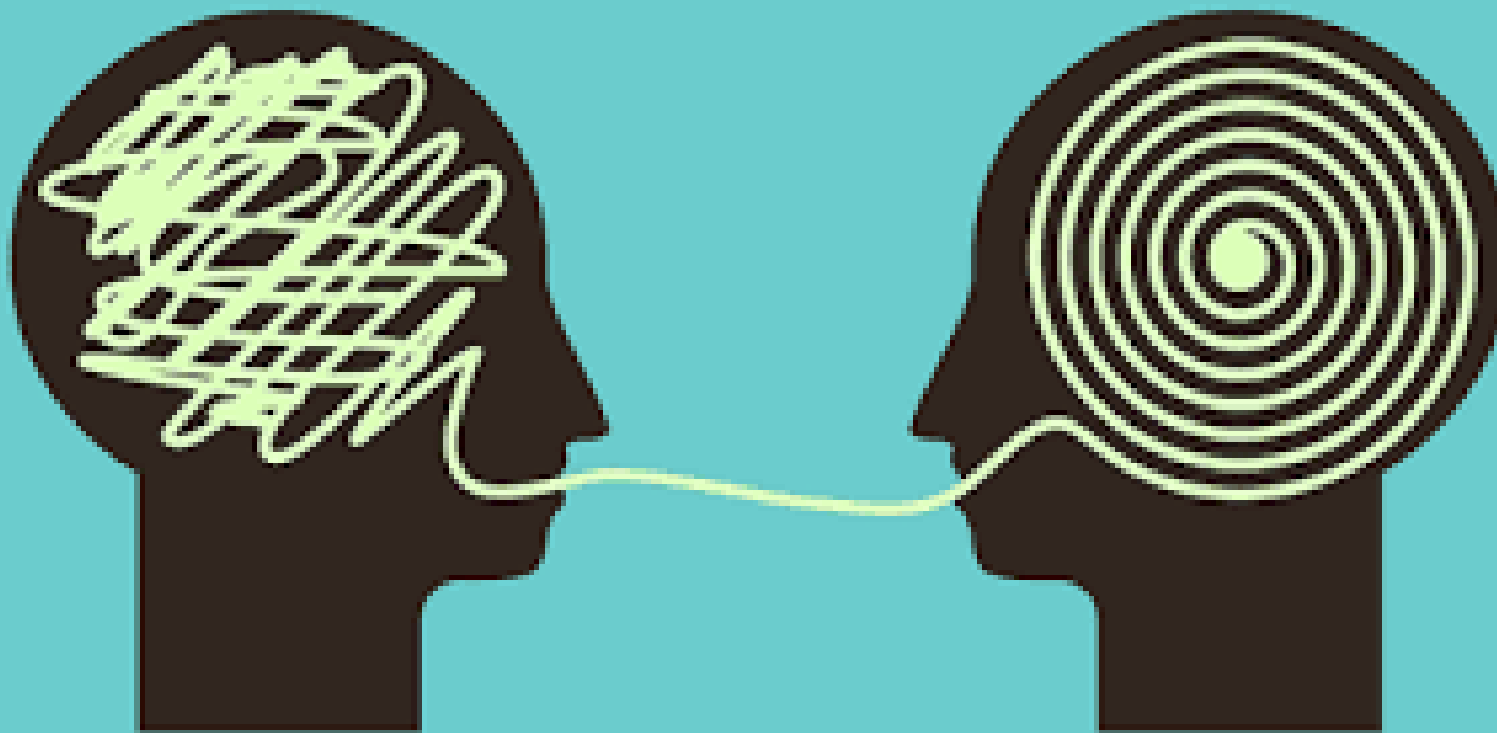
Advantages of Programmed Instruction

- The main emphasis is on individual differences and students' involvement.
- There is not fixed time interval for learning. Students may learn at their own pace.
- Learning by doing maxim of teaching is followed to involve learners in the learning process.
- Students are exposed only to correct responses, therefore, possibility to commit errors in reduced.
- Immediate confirmation of the results provides reinforcement to the learners and encourages the learners to proceed further. Feedback is provided to wrong answers, so that learner is able to develop mastery over the content.

Disadvantages of Programmed Instruction

- It is very difficult to develop an instructional programme
- Only cognitive objectives can be achieved
- Due to tight schedule of time table, students cannot be left to learn at their own pace. It would be very difficult to learn the content the subject matter in a limited period of time.
- There is no chance for students' creativity, their responses are highly structured.
- Development of programme is not economical in terms of cost and time
- In absence of the teacher, students may spoil the disciplinary tone of the class, or they will be helpless when any problem arises.
- It cannot be applied at primary level of education or at higher education

Deductive and Inductive



What is deductive method

- A deductive approach to instruction is a more teacher-centered approach.
- This means that the teacher gives the students a new concept, explains it, and then has the students practice using the concept.
- For example, when teaching a new grammar concept, the teacher will introduce the concept, explain the rules related to its use, and finally the students will practice using the concept in a variety of different ways.

What is inductive method

- In contrast with the deductive method, inductive instruction makes use of student “noticing”.
- Instead of explaining a given concept and following this explanation with examples, the teacher presents students with many examples showing how the concept is used.
- The intent is for students to “notice”, by way of the examples, how the concept works.

D e d u c t i v e

Generalization (or Rule) —————> Specific Examples or Activities

I n d u c t i v e

Specific Examples or Activities —————> Generalization (or Rule)

Figure 1, Deductive and Inductive Learning adapted from
<https://www.sasked.gov.sk.ca/docs/policy/approach/instrapp05.html>

Advantages & Disadvantages

| Approach | Advantages | Disadvantages |
|--------------------|--|--|
| Deductive Approach | It gets straight to the point and can therefore be time-saving. Many rules can be more quickly explained than elicited, thereby allowing more time for practice and application. | Starting the lesson with a grammar explanation may be frustrating for some students, especially younger ones. They may not have sufficient metalinguage or may not be able to understand the concepts involved. |
| | It respects the intelligence and maturity of many students and acknowledges the role of cognitive processes in language acquisition. | Grammar explanation encourages a teacher-fronted, transmission style classroom. |
| | It confirms many students' expectations about classroom learning, particularly for those with an analytical learning style. | Explanation is seldom as memorable as other forms of presentation, such as demonstration. |
| | It allows for teachers to deal with language points as they come up rather than having to anticipate them and prepare for them in advance. | Such an approach encourages the belief that learning a language is simple a case of knowing the rules. |

Advantages & Disadvantages

| Approach | Advantages | Disadvantages |
|--------------------|--|---|
| Inductive Approach | Rules learner discover for themselves are more likely to fit their existing mental structures, making them more meaningful, memorable and serviceable. | Time and energy spent working out rules may mislead students into believing that rules are the objective of language learning. |
| | The mental effort involved ensures greater cognitive depth, again ensuring greater memorability. | Students may hypothesize the wrong rule, or their version of the rule may be either too broad or too narrow. |
| | Students are more actively involved in the learning process and are therefore likely to be more attentive and motivated. | It can place heavy demands on teachers in planning a lesson. |
| | Working things out for themselves prepares students for greater self reliance and autonomy. | An inductive approach frustrates students who, because of personal learning style or past learning experience, would prefer simply to be told the rule. |



THANK YOU