

# SCIENCE PEDAGOGY

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# PEDAGOGY



- **Pedagogy is an art of Teaching.**
- It is essentially a combination of knowledge and skills required for effective teaching.
- The more traditional definitions describe pedagogy as “Either the science/theory or art/practice of teaching that makes a difference in the intellectual and social development of students.”

**SCIENCE** is about wonderful nature and natural phenomena and led to wonder and awe. Science used experiment or perform experimental process.

### **NATURE OF SCIENCE**

1. Science is a wonderful world.
2. Science is evidence-based.
3. Science has limits.
4. Science knowledge is inherently uncertain
5. Science is dynamic and expanding body of knowledge.
6. Science is both a product and a process.
7. Science is a field of study.


## Scientific attitudes and values that Science teaching wants to integrate

1. Critical Problem Solving
2. Innovation of beneficial products.
3. Environmental Care
4. Conservation of resources
5. Enhancement of integrity and wellness
6. Informed decision-making
7. Discussion of relevant issues that involves science, technology and environment.



## **Towards development of scientific attitude**

- Open mindedness
- Curiosity
- Tolerance
- Honest doubt
- Respect for other's point of view
- Critical observation and thought
- Freedom from superstition
- Judgment based on scientific facts
- Planned procedure in solving problems



Some of the objectives of teaching science in the school curriculum should be directed towards:

- better understanding of the nature of science.
- acquisition of skills.
- development of scientific attitudes
- training in scientific method
- development of interest and appreciation
- helping the students fit themselves better in the society
- helping students develop suitable career interest

# Difference b/w aims and objectives

## Aims

- Directions in education
- Attainment of aim is beyond scope of school
- Are directions encompassing entire educational system in and out of school
- Broad and general

## Objectives

- End points of possible achievement
- Specific, immediate, attainable goals
- Vary from subject to subject
- Narrower and specific

# What is teaching?

- **Teaching is a process intended for learning by inducing a behavioral change in the taught.**
- **It is an art of communicating a message with impact on audience.**
- **Teaching creates knowledge awareness and feelings in the taught and brings about behavioral change.**
- **Teacher learns while teaching**



# TYPES OF TEACHING

- 1. ACTIVE**
- 2. PASSIVE**
- 3. LEARNER ORIENTED**
- 4. TEACHER ORIENTED**

# CRITERIA OF GOOD TEACHING

- **Good Concept ( thorough preparation)**
- **Organized Content( lesson planning)**
- **Good Quality and optimum quantity**
- **Sequence**
- **Relevance**
- **Learner oriented**

# TEACHING METHODS

1. Lecture
2. Lecture discussion
3. Seminar
4. Symposium
5. Panel discussion
6. Group discussion
7. Tutorials
8. Role play
9. Integrated teaching (horizontal and vertical)
10. Talking point sessions
11. Workshops
12. Conferences

# TEACHING PRACTICE

1. SET INDUCTION
2. INTRODUCING TOPIC
3. TOPIC ORGANIZATION
4. REINFORCING OR STIMULATING
5. SUMMARIZING

# Teaching skills

- A teaching skill is that behavior of the teacher which facilitates pupils' learning directly or indirectly.
- A teaching skill includes all arts and behavior of the teacher which maximizes pupils' learning.

# Microteaching in India

- The department of Teacher education in the NCERT designed a project to study the effectiveness of Microteaching in 1975 in collaboration with the Centre of Advanced Study in Education (CASE) Baroda.
- Research and training programs for teacher educators were also initiated in collaboration with the department of Education, University of Indore.
- **Passi.B.K**, Singh and Jangira developed instructional materials which were used to train teacher educators.

# Characteristic of Microteaching

- Microteaching is a highly individualized training device.
- Microteaching is an **experiment** in the field of teacher education which has been incorporated in the practice teaching schedule.
- It is a student teaching skill **training technique** and not a teaching technique or method.
- Reducing the duration of lesson to 5- 10 minutes.
- Microteaching is micro in the sense that it scale down the complexities of real teaching.

# Characteristic of Microteaching

- Reducing the class size to 5 – 10 pupil
- Reducing the duration of lesson to 5 – 10 minutes
- Limiting the content to a single concept
- immediate feedback helps in improving, fixing and motivating learning
- The student are providing immediate feedback in terms of peer group feedback, tape recorded/CCTV
- Microteaching advocates the choice and practice of one skill at a time



# The steps of micro-teaching cycle



# PHASES OF MICRO TEACHING

## 1. Knowledge acquisition phase:

Observing, analyzing and discussing about the demonstration.

## 2. Skill acquisition phase:

Prepare the micro lesson involving the skill and practicing it.

## 3. Transfer Phase:

Evaluating the performance through feedback, replan and reteach

# Steps of Micro-teaching

- **Step I-** Particular skill to be practiced is explained to the teacher trainees in terms of the purpose and components of the skill with suitable examples.
- **Step II-** The teacher trainer gives the demonstration of the skill in Micro-teaching in simulated conditions.
- **Step III -**The teacher trainee plans a short lesson plan on the basis of the demonstrated skill for his practice.
- **Step IV-** The teacher trainee teaches the lesson to a small group of pupils. His lesson is supervised by the supervisor and peers.

# Steps of Micro-teaching

- **Step V** -On the basis of the observation of a lesson, the supervisor gives **feedback** to the teacher trainee. The supervisor reinforces the instances of effective use of the skill and draws attention of the teacher trainee to the points where he could not do well.
- **Step VI**- In the light of the feed-back given by the supervisor, the teacher trainee **re-plans** the lesson plan in order to use the skill in more effective manner in the **second trial**.
- **Step VII**- The revised lesson is taught to another comparable group of pupils. **second trial**

# Steps of Micro-teaching

- **Step VIII**- The supervisor observes the re-teach lesson and gives **re-feed** back to the teacher trainee with convincing arguments and reasons.
- **Step IX** -The 'teach – re-teach' cycle may be **repeated** several times till adequate mastery level is achieved.

# *Duration*

- Teach : 6 Minutes.
- Feedback : 6 Minutes.
- Re-Plan :12 Minutes.
- Re-Teach : 6 Minutes.
- Re-Feedback : 6 Minutes

# Merits of Microteaching

- It helps to develop and master important teaching skills.
- It helps to accomplish specific teacher competencies.
- It caters the need of individual differences in the teacher training.
- It is more effective in modifying teacher behavior.
- It is an individualized training technique.
- It employs real teaching situation for developing skills.
- It reduces the complexity of teaching process as it is a scaled down teaching.
- It helps to get deeper knowledge regarding the art of teaching.

# Limitations of Microteaching

- It is skill oriented; Content not emphasized.
- A large number of trainees cannot be given the opportunity for re-teaching and re-planning.
- It is very time consuming technique.
- It requires special classroom setting.
- It covers only a few specific skills.
- It deviates from normal classroom teaching.
- It may raise administrative problem while arranging micro lessons