

# Modern Methods in Environmental Science

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## ABSTRACT:

The diverse discipline of environmental science is dedicated to examining how people and the environment interact. Modern techniques to solve complicated environmental concerns and encourage sustainable practises have arisen as a result of the increasing awareness of environmental difficulties. In order to solve environmental issues, this study presents an overview of several contemporary environmental science methodologies. Remote sensing, Geographic Information Systems (GIS), environmental modelling, and sustainable technology are some of the techniques covered. Effective environmental management strategies have resulted from the adoption of these methodologies, which have permitted enhanced data collecting, analysis, and decision-making processes. Additionally, these techniques have helped us better understand ecological systems, foresee environmental effects, and develop mitigation strategies. Modern approaches in environmental science play a critical part in creating environmental sustainability and a brighter future for our planet by using the power of technology and scientific discoveries.

## KEYWORDS:

Environmental, Lecture, Methods, Science, Students, Teaching.

## I. INTRODUCTION

Even the best curriculum and the most perfect syllabus remain dead unless quickened into life by the right teaching methods and the right kind of teachers, said one education expert. The Secondary Education Commission states [1], [2]. The most crucial link in the whole teaching-learning chain is technique since it is the means of achieving predefined outcomes. It serves as the intermediary link connecting the value to the goals. It establishes the level of the outcome. At the upper secondary level, environmental science is a crucial topic, thus teachers must choose efficient teaching techniques and approaches for it. Below are some key tactics and techniques explained:

### Meaning of Teaching Strategies

The definition of a teaching strategy is a generalized plan for a lesson that comprises structure, expected learner behavior in terms of instructional objectives, and an overview of planned tactics required to accomplish the strategy [3]–[5]. The lesson plan is a component of the curriculum's overall development plan. S. Morris and E. Stones.

### Types of Teaching Strategy

It could fall under one of the following two broad categories:

1. Autocratic styles.

- i. Lecture.
- ii. Lesson Demonstration.
- iii. Tutorials.
- iv. Programmed Instruction

2. Permissive Styles

- i. Question-Answer.
- ii. Project Strategy.
- iii. Review.
- iv. Group Discussion.
- v. Role Playing.

- vi. Discovery.
- vii. Brain Storming.
- viii. Leaderless Group.

Autocratic teaching methods include an autocratic attitude. More so than permissive teaching methods, these tactics accomplish various goals. The tactics used in an autocratic approach are content-focused, the instructor is more engaged, and the students are passive observers. While liberal teaching styles often accomplish effective goals, autocratic teaching tactics tend to realise cognitive goals. The presentation is the primary focus. These tactics don't take into account the learner's aptitudes, interests, or personality. The instructional approach does not provide the student any independence [6]–[8]. These traditional teaching methods are quite subjective. According to Modern Theory of Organisation of Task and Relationship Centre, permissive teaching methods are founded. This fashion is less typical. The students generally select the material, which is mostly child-centered. Permissive style tactics mostly succeed in achieving the emotional goals. With the help of these techniques, teachers and students may converse while still actively participating in the classroom. The organisation of instruction takes into account the values, skills, and interests of the students. These techniques support students' inventiveness.

### **Importance of Instructional Strategies**

- i. These are traditional teaching methods with a lot of subjectivity.
- ii. Students are passive listeners while teachers are more engaged.
- iii. Teachers may teach as they choose in the classroom.
- iv. The student receives instructional supervision, remedial assistance, and a sense of community in the class.
- v. It forges a fresh connection with the learner's prior knowledge.
- vi. It places a greater focus on achieving learning goals than on students' interests.
- vii. The learning environment and learning goals must be met.

### **Objective of Teaching Methods**

The goals of environmental science instruction should guide the methods used to provide that instruction. The techniques to be utilised in teaching a unit are determined by its particular objectives or purposes as well as by the kind of material it contains. To fulfil the broad goals of teaching environmental science, appropriate approaches must be used, including exposing students to information and experiences that will foster their understandings, critical thinking, practical skills, and previously mentioned interests. Additionally, methods teach critical thinking, logic, and constructive thinking. The objectives for teaching environmental science include greater and more thorough student engagement [9]–[11]. Students should be exposed to a range of learning activities, such as book study, observing, interviewing, surveying, interpreting, reviewing, recording, reporting, and assessing, in addition to lectures and question-and-answer sessions. Learning activities should be designed to help students develop and modify their behaviours, as well as to prepare them to be informed, discerning, dynamic, productive, and democratic citizens.

## **II. DISCUSSION**

### **Need of Modern Methods in Environmental Science:**

There are several paths to effective learning that may be pursued to address specific needs and circumstances. The instructor should also use many permutations and combinations of strategies, tools, and tactics to add colour to classroom instruction and make the topic engaging, relevant, and alive. He could use a lecture, a conversation, or a mix of the two. The instructor must be familiar with a range of environmental science teaching techniques. Different lessons or units have to be taught using various teaching strategies. Using the same techniques in every situation might become quite boring. Equipment materials, methods, and instructional techniques have increased dramatically during the last several decades. To provide diversity and colour to the teaching of environmental science, they should be used. Children should be exposed to a variety of experiences in order to develop and sustain their interest and avoid becoming monotonous. There isn't a single approach that works well in all circumstances or for all instructors and students. The best teaching strategy should come from the teacher's wealth of knowledge and expertise. It ought to fit with the subject matter that will be taught. Every environmental science instructor should be conversant with the various methods of calculating the necessary results.

## **Characteristics of Good Teaching Method**

### **1. Group-Related Activities and Experiences**

In order to induce changes in the students' knowledge, understanding, habits, attitudes, abilities, and behaviour, a good method should provide a collection of connected experiences and activities that are organised on both an individual and group basis.

### **2. Scope for Creative Expression**

A good teaching approach should allow for the child's personality to be expressed creatively.

### **3. Content Interests**

An excellent approach should pique students' interest in a wide variety of topics rather than serving as a mechanical means of imparting information.

### **4. A change in the focus**

A good approach should place more focus on learning than verbalism and memory via intentional, tangible, and realistic events.

### **5. Instruction for Self-Study**

An effective teaching strategy should teach pupils how to learn on their own and how to learn via initiative or intuition.

### **6. Boosting Interest in Studying and Stimulation**

A good approach should pique interest in more research and inquiry. A good approach should spark curiosity in the tools and processes used in environmental science. It should provide students a peek inside the Environmental Science lab so they may learn about the many ways people perceive events and character conflicts.

## **Different Methods of Teaching Environmental Science**

The instructor should ensure that the information is adequately taught, learned, and experienced using the most effective teaching techniques after choosing the topic or subject matter. Since teaching goals and objectives are directly tied to methodology, it's important to keep in mind the main objectives of teaching environmental science. The following:

1. Lecture Method.
2. Lecturer cum Discussion Method.
3. Project Method.
4. Source Method.
5. Socialized Recitation.
6. Supervised Study.

### **1. Lecture Method**

The lecture approach is also known as teaching orally. It denotes a teacher giving a formal speech. With the lower middle classes and the main population, it may be described as the Telling of Story or Conversational Method. It could be referred to as Lecture Method in higher education courses.

At the university and above levels, the lecture approach is safe to utilise. Even at this point, the lecture must be engaging and well-prepared in order to pique the students' curiosity and engage their minds. At the conclusion of the lecture, the students should be encouraged to ask questions. Their inquiries are a definite indicator that the talk was effective.

### **2. Lecture Method at School Level**

According to conventional wisdom, lecturing is a time-honored method of information transfer. However, it has a very poor reputation as a teaching strategy for secondary school students. A competent secondary school teacher is mindful to limit their speaking time. He does not control how people learn. The teacher offers practical learning for the group of students in his class by taking on the lion's share of the responsibility for Organising and directing a variety of activities, experiences, and situations. A lecture may be seen as a method of description,

explanation, and clarification when a teacher deliberately chooses the best strategies to satisfy the requirements, interests, and capabilities of his students at a certain moment and in a specific context.

## **Utilization of Lecture Method**

### **1. Ineffective Method**

A spoken message always has greater impact than one written down. By dramatising a scenario, a narrative, or a message that he wants to impart, the instructor may add colour and vividness to his presentation, something that a written book cannot accomplish, and he can also indicate the specific meaning that he means to convey.

### **2. Quickly Repeated and Modified**

A teacher may repeat his points, elaborate on them, or otherwise adjust his message if he believes that his students are not understanding or appreciating what he has said. Never should he try to talk over the heads of his students.

### **3. Experiences in Learning by Hearing**

Children in schools in democratic nations must get preparation for adulthood so they may engage completely and effectively as democratic citizens in matters of national and worldwide concern. Whether one is a leader or a follower, lectures and discussions are an integral aspect of adult life. Through sporadic chats and engaging lectures planned for students of various sorts, children should be prepared for this from the school stage forward.

### **4. Saving of Time and Energy**

Due to their complexity, environmental science facts may sometimes be difficult for students to understand in textbooks since specifics are seldom provided and interpretations can occasionally be incorrect. The students could invest a significant amount of their precious time and effort in reading additional sources for the explanation of such challenging concepts. Here, the teacher's well-presented lecture is of the utmost value.

### **5. Stimulation for Students**

Due to the teacher's extensive preparation required for a lecture, the benefits are shared by the whole class. The preparation, excitement, and interest of the teacher themselves inspire excellent pupils. To learn more and more knowledge, they may now choose to undertake projects, issues, and other such activities.

## **Objectives of Lecture Method**

- i.** To stimulate students.
- ii.** To clarify concepts.
- iii.** To supplement the knowledge, of pupils.
- iv.** To sum up the findings of pupils.
- v.** To prepare the students to undertake an assignment, a project or an activity.

## **Limitations of Lecture Method**

### **1. Unnatural Way of Learning**

Not often seen as a natural method of teaching for the students They are put in the role of passive listeners by the lecture method. Throughout the conversation, they may stray off to some happier ideas and maybe pay no attention to the conversation at all.

### **2. Requires Trained Teachers**

Many educators lack the skills necessary to deliver lectures effectively. They are unable to effectively plan and provide discussions on the subject covered in the textbook. This approach can only be successful with skilled instructors.

### **3. A Heavy Teaching Load on Teachers**

A teacher who is supposed to teach in the classroom nonstop from the first period to the last, without giving lectures. He won't be able to prepare as many brief yet engaging lectures every day. He is physically capable of speaking nonstop for four to five hours each day. Therefore, lecture time should be kept to a minimum.

#### 4. Harmful Extensive Use

The lecture approach is often employed in place of the textbook and the instructor. Only sporadic and casual conversations could be useful for achieving certain goals.

#### 5. Monotonous and Dullness

At all school levels, only extraordinary instructors can pique attention with their lectures. They use a number of techniques rather than just one or two in order to minimise monotony and to make the lesson successful. If solely the lecture technique is used, the teachings could become monotonous and dry.

#### Effectiveness of Lecture Method

Since lecturing is an art, it relies on the teacher's expertise as well as his sense of student interest and motivation. A lecture aims to provide a whole out of several connected informational pieces acquired piecemeal via various methods. Its primary goal is to reaffirm fundamental concepts and facts and to position them in a framework of thinking. Thousands of people swarm to lectures that are engaging, motivating, educational, and thrilling.

To guarantee success, similar speeches should be delivered in the classroom. A teacher must to adhere to the following:

- i. Providing context for a subject.
- ii. Providing a general overview of a big unit.
- iii. Getting people interested.
- iv. Clarifying and correcting some incorrect assumptions or providing a clever assignment.

#### Delimitation of Lecture Method

Occasionally, a teacher may hint to a subject or unit that will be covered in a future lecture. Thus, it is possible to encourage students to eagerly await lectures. Before teaching, the instructor should write up a summary of the lecture and provide it to the students. It will assist the students in paying full attention to the lecture in addition to freeing the instructor from useless digressions. The instructor should talk slowly and clearly when giving the lesson so that the students can follow along. He should converse with the pupils rather than provide a lecture. Additionally, he has to raise and lower his voice to emphasise a point and draw the students' attention. He feels more at ease and gives everyone in the class an equal chance to see and hear by shifting positions often yet naturally. The lecture should be humorous and infused with analogies, parallels, examples, and stories relevant to the subject. The use of visual aids like photos, videos, filmstrips, slides, diagrams, etc. makes the presentation more engaging. A written exam may be administered after the lecture to assess its effectiveness. If the students have learned well, the talk was successful. If the lecture doesn't appear to have any impact, the instructor may change his approach.

### III. CONCLUSION

Through the use of scientific techniques and technology, environmental science is a crucial discipline that seeks to comprehend and manage environmental problems. This essay has emphasised a few contemporary approaches that have transformed our understanding of the environment and how human activity affects it. Researchers now have an effective method to track and evaluate significant environmental changes, such as deforestation, land use, and climate trends, thanks to remote sensing. The integration of geographical data using Geographic Information Systems (GIS) has made it possible to analyse intricate environmental systems and spot susceptible regions. Environmental modelling has been a key tool for scenario planning, assessing the effects of human activity, and assisting with well-informed decision-making.

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