

## A Review of Teaching Methods: Inductive and Deductive

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**Abstract:** *The concept of teaching has undergone significant evolution. Teaching has to be supportive environment for learning, assisting others in learning, actions performed by teachers and an interactive process. There are two nearly opposite ways to teaching: the inductive and deductive methods. A deductive approach (rule-driven) starts with the presentation of a rule and is followed by examples in which the rule is applied, while an inductive approach (rule-discovery) starts with some examples from which a rule is inferred.*

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### Introduction

The idea that people are most powerfully inspired to learn about subject matter they clearly perceive as needing to be known is a well-established concept of educational psychology. It is not a very good motivation to merely remind pupils that they will need specific knowledge and skills at some point. In addition there is a need of specific and appropriate methods of teaching in order for learning some specific areas and objectives.

In the course of time the concept of teaching has undergone significant evolution. Today, teaching is a catch-all word that is full of misconceptions. Many similar terminology and concepts are used interchangeably since it covers so much ground. Consequently, transmitting knowledge or skills, doing everything and everything that could result in learning, and engaging in socially influential behavior are all considered forms of teaching.

### Nature of Teaching

Teaching can be defined as an activity that promotes learning in its widest meaning. The specific application of information, abilities, and qualities intended to offer a special service to meet the requirements of society and the individual in terms of education is known as teaching.

In the most general sense, teaching is the process by which an instructor leads a student or group of students to a greater level of knowledge or abilities (Nilsen and Albertalli, 2002). As per Desforges (1995), Teaching is the intentional control of students' experiences, mostly in the classroom, with the goal of advancing their learning.

Gage describes the principles of predictability and the nature of excellent teaching by drawing a distinction between teaching as science and art. "A science of teaching is unattainable", he stated as it "implies that good teaching will someday be attainable by closely following rigorous laws that yield high predictability and control" (Gage, 1978). He also notes that teaching is more than just science because it takes artistry into account.

Dawe offers his assessment of education as an art form in isolation. He views teaching as a kind of acting, believing that individuals who want to become teachers should try out in a classroom and those teachers should be trained like actors (Dawe, 1984a & 1984b). Furthermore, it is important to be aware that certain definitions of teaching have been reexamined and reorganized into four clusters that emphasize different aspects, with corresponding definitions presented in an understandable manner.

### Teaching as Supportive Environment for Learning

- Teaching is the design of circumstances that result in positive relationships and make them meaningful (Thorndike, 1913).

- Teaching is the setting up and management of a scenario with gaps or obstacles that a person must overcome and learns from while doing so (Brubacher, 1939).
- Setting up the external learning environments is what teaching entails. The creation of these conditions must be done step-by-step, taking into consideration the learner's recently acquired abilities, the conditions necessary for their retention, the unique stimulus, and the circumstances required for the subsequent learning stage (Gagne, 1965).
- The setting up of reinforcement contingencies is teaching, which is how students learn. In their natural environments, they learn without instruction, but teachers set up specific circumstances that speed up learning, ensuring that behavior that might never otherwise manifest or hastening the appearance of behavior that would otherwise be acquired slowly (Skinner, 1968).

### Teaching as Assisting Others in Learning

- Teach; provide information or expertise; provide guidance or instruction; inculcate, motivate with (Little Oxford Dictionary).
- Teaching is the personal interaction between a more experienced individual and a less experienced one with the goal of advancing the latter's education (Morrison, 1934).
- A teacher's actions are directed by the creation of a lesson plan in a structured learning environment. This is known as teaching (Mittra, 1972).
- Teaching is defined as a conversation between people that is aimed at helping one or more people learn (Kauer, 1985).

### Teaching as Actions Performed by Teachers

- A set of activities called teaching is meant to promote learning (Smith, 1961).
- Teaching is the performance of a series of actions by a person with the intention of either informing or demonstrating to others that something is true (Smith, 1971a).
- Teaching involves a variety of activities, including questioning, explaining, demonstrating, maintaining records, housekeeping, creating assignments and curricula, testing, and assessing (Gage, 1972).
- Teaching is a procedure or an action (Jackson, 1986).

### Teaching as an Interactive Process

- Teaching is a kind of interpersonal influence where the goal is to modify another person's ability for behavior (American Educational Research Association).
- Teaching is an interpersonal effect meant to modify the behavior of others, either now or in the future (Gage, 1963).
- Teaching is... an interactive process that involves discourse in the classroom between the teacher and students during certain tasks that can be defined (Amidon and Hunter, 1967).
- Teaching is a sequence of interactions between a student and a teacher with the specific aim of altering one or more of the learner's cognitive states (Bidwell (1973).

### Strategies, Methods and Patterns of Teaching

The main focus of strategies, methods, and patterns is on the progression of teaching behaviors that vary in complexity. These three have been distinguished from one another for the purposes of the current study, as being discussed subsequently.

The strategies that deal with methods like expository, discovery, inductive, and deductive are more generalized in nature. These are predicated on a logical examination of the text. Certain lesson restrictions, such as those related to time, money, student characteristics, and material, may make it difficult to

immediately use certain strategies. As a result, the instructor must adapt or use these strategies to fit the specific circumstance. Within this framework, strategies are transformed into methods for instruction, such as the guided discovery method, the deductive method, and the inductive method. Therefore, choosing a strategy always comes before choosing a method. A method, to put it briefly, is the order in which the material is presented in the classroom.

A given approach or method is transformed into distinct teaching patterns when it is used in a real classroom and interacts with various kinds of students. As a result, instructional patterns are visible manifestations of specific instructional strategies or methodologies. Different teaching patterns emerge when a technique interacts with students in a classroom setting.

### Inductive and Deductive methods of Teaching

It is well known that teachers have been exploring with various methods of instruction for an extended period of time. Teachers usually keep trying out new strategies and altering their teaching methods in order to fulfill the requirements and expectations of their students. There are two nearly opposite ways to teaching: the inductive and deductive methods. The primary distinction between these two highly different and diametrically opposed instructional approaches, offering potential benefits, is the teacher's role.

Inductive and Deductive methods are defined by Thornbury (1999) as:

A deductive approach (rule-driven) starts with the presentation of a rule and is followed by examples in which the rule is applied, while an inductive approach (rule-discovery) starts with some examples from which a rule is inferred.

### Deductive Method of Instruction

A more teacher-centered method of instruction is the deductive approach. This implies that the instructor introduces a new idea to the class, discusses it, and then assigns some practice applying it. When teaching a new concept, for instance, the instructor might first present the idea, then go over the usage guidelines, and lastly have the students experience applying the idea in a number of various contexts. A traditional way of teaching linguistic principles is the deductive method, which has been around for a long period. After outlining the rules, the teacher delivers a number of instances that illustrate how they should be followed.

### Inductive Method of Instruction

Compared to the deductive approach, the inductive method leverages students' "noticing." Rather than providing an explanation of a concept and then providing examples to support it, the instructor gives the students several instances that demonstrate the concept's application. The idea is for pupils to "notice" how the topic functions through the examples. In this situation, the instructor would give the class a range of examples for a certain concept without explaining how the concept is used beforehand.

### Inductive and Deductive Strategies: Distinctions

Whenever teaching a language or any other subject, teachers must employ both deductive and inductive reasoning techniques. It is believed that weaker students gain more from deductive learning. The descriptions of both strategies make it evident that they are both appropriate for use in the learning process given the academic atmosphere and standards. It is the responsibility of the instructor to try to provide the pupils opportunities to engage and learn. For better understanding teachers and students should follow the variations, merits and demerits between Inductive and Deductive Strategies which are given in Table 1 and Table 2.

Inductive	Merits	Demerits
	Due to their adaptability and flexibility, inductive learning models work well with challenging, dynamic, and complicated data.	Overfitting to specific training data is a possibility for inductive learning models.
	Uncovering hidden patterns and connections in data: Pattern recognition and classification tasks are perfect fits for inductive learning models.	The computationally expensive nature of inductive learning models may limit their use in real-time applications.
	Large datasets; Inductive learning models	Restricted interpretability: Inductive learning

	work well in applications where processing large amounts of data is necessary.	models can be hard to grasp, which makes it challenging to comprehend how they make their predictions.
	Suitable in contexts with unclear rules since inductive learning models can pick up knowledge from cases without the need for explicit instruction.	The efficacy of inductive learning models is contingent upon the quality of the data used for training; imprecise or insufficient data may lead to the model's inability to function as intended.
<b>Deductive</b>	<b>Merits</b>	<b>Demerits</b>
	Deductive learning is often faster than inductive learning since it starts with general concepts and integrates them to specific situations.	The existing rules, which might not be sufficient or up to date, limit deductive learning.
	Given that deductive learning begins with specific concepts and applies them to the data, it can occasionally produce more accurate results than inductive learning.	Deductive learning is not suitable for complex problems with imprecise rules or inconsistent variables, nor is it suitable for unclear problems.
	Since deductive learning requires fewer data than inductive learning, it is more practical when data are limited or difficult to obtain.	The accuracy of deductive learning depends on the quality of the knowledge base and rules, which may introduce biases and errors into the outcomes.

Table 1: merits and demerits of inductive and deductive methods

<b>Deductive</b>	<b>Inductive</b>
From general to specific	specific to general
controlled by rules	Rule established
Teacher centered	Learner centered
Conscious	Subconscious
Accuracy highlighted.	Fluency is highlighted
Passive partakers	Active partakers
Individual	Team work
reliant	Autonomy
Rules applied	Tackling issues
Cognitive	Associative or connected

Table 2: dissimilarity between deductive and inductive methods

### Similarities and Differences

There are some Similarities and Differences between Inductive and Deductive Methods. They are both forms of logic with premises and conclusions that help determine the truth. Both can help draw generalizations and stress true logic during scientific reasoning.

While deductive reasoning draws a reasonable conclusion from the facts or information at hand, inductive reasoning extrapolates a generalization from specific observations and facts. Deductive reasoning follows a top-down methodology, whereas inductive reasoning follows a bottom-up methodology. While deductive reasoning yields certain results, inductive reasoning leads to probabilistic conclusions. Both strong and weak inductive arguments have the potential to lead to wrong conclusions even in cases when the premises are valid. Deductive arguments are not always valid, thus even if the premises are true the conclusion still has to be true.

### Summary and Conclusion

As previously demonstrated, the deductive method is basically a top-down method that proceeds from the more general to the more specific. That is, a teacher begins with a broad idea or theory, which he then refines to a few particular hypotheses, which are then put to the test. The inductive technique is a more bottom-up method where a teacher takes specific observations, looks for patterns, develops hypotheses, and draws conclusions. It goes from the more specific to the more general.

Both methods are frequently found in published sources. While some course books may be more flexible and include both approaches' practices in accordance with what is taught, others may include practices on just one approach as in a series format. Stated differently, the learner is guided in determining the rule through activities and questions. Although methods may alter, the objectives stay the same, and each strategy has benefits and drawbacks.

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