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Instructional Theory

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Instructional theory concerns anything that is done purposely to facilitate learning. This entry describes the nature of instructional theory, including its major components. It identifies the major kinds, paradigms, and domains of instructional theory. Finally, it describes a variety of research methods to improve instructional theories.

What Is Instructional Theory?

Instructional theory is a design theory rather than a descriptive theory because it is goal oriented or instrumental: Its purpose is to offer the best known methods of instruction to accomplish given goals under given conditions. This stands in contrast to learning theories, such as schema theory and information processing theory, whose purpose is to describe learning processes. They do not offer guidance about how to facilitate learning. Design theory is concerned with creating something, whereas descriptive theory is concerned with what already exists (typically cause–effect relationships or natural processes).

Instructional theory is also often confused with the instructional development process. Instructional theory provides an image of the instruction, whereas the instructional development process is concerned with the process of creating the instruction. This is similar to the distinction between an architectural blueprint and the process for constructing the building. Other areas not strictly within the scope of instructional theory are assessment theory, which offers guidance about how to evaluate student learning, and curriculum theory, which offers guidance about what should be learned.

Every instructional theory has two major components: instructional methods and the situations in which those methods are believed to be preferable to the alternatives.

Methods

Instructional methods can vary in the following ways.

Scope of a Method

This is the amount of instruction that a method encompasses. It is a continuum that spans from micro (for an individual skill or understanding) through meso (for a cluster of related skills and/or understandings) to macro (for an entire course or curriculum). Most instructional theories address only one or sometimes two levels.

Generality of a Method

This is the breadth of situations for which a method is recommended. It is a continuum that ranges from universal (or pervasive, common) to local (or narrow, restricted). Most instructional theories claim more generality for their methods than is warranted. It is important to look for situations in which each method is not preferable to the known alternatives.

Precision of a Method

This is the level of detail of the *description* of a method—again on a continuum. More precision can be added to a method by describing its *parts*, by describing alternative ways of

doing the method (*kinds*), and/or by providing *criteria* for making a decision regarding the method. The methods in most instructional theories are described at a relatively imprecise level. It is helpful to understand that the more precisely a method is described, the less general (more situational) it is likely to be.

Power of a Method

This is the degree to which a method contributes to attain the learning goal for which it was selected. This continuum is based on the increase in probability that the goal will be achieved as a result of using the method, all else being equal. Most instructional theories focusing on the methods the theorist believes are the most powerful.

Consistency of a Method

This is the reliability with which a method contributes its power to attain the learning goal in the situations for which it is appropriate. This continuum describes how much variability there is in the effectiveness of the method. Most instructional theories provide little information about the consistency of their methods.

Situations

Like methods, the instructional situations can vary in several ways. They include the following.

Values

These are aspects of instruction that are considered important by an instructional theory. They are a matter of opinion rather than a matter that can be proven. The latter are principles of instruction, rather than values. The set of values underlying an instructional theory represent an educational philosophy. It is important to make sure that the values of a theory align with the values of the stakeholders of the instruction (instructors, learners, and their institution), so each instructional theory should explicitly state the values upon which it was created. Kinds of values include the following:

Values About Learning Goals

These are statements about which learning outcomes are valued (philosophically). These are contrasted with learning outcomes that are identified empirically through a needs analysis.

Values About Priorities

These are statements about priorities that should be used to judge the success of the instruction. They concern the relative importance of the effectiveness, efficiency, and appeal of the instruction.

Values About Methods

These are statements about the instructional methods that are valued from a philosophical point of view. They are contrasted with methods that have been empirically proven to be successful.

Values About Power

These are statements about who is given power to make decisions about goals, priorities, and methods.

All these kinds of values tend to vary depending on the situation.

Conditions

In addition to values, there are other factors that can influence the selection of instructional methods. They include the following:

Content

This is defined broadly as the nature of what is to be learned, which includes such things as metacognitive skills, emotional and social development, and values.

Learner

This is the nature of the learner, including prior knowledge, learning styles, learning strategies, motivations, interests, and more.

Learning Environment

This is the nature of the environment in which learning will occur, which includes human resources, material resources, organizational arrangements, and more.

Instructional Development Constraints

These are the resources available for creating and implementing the instruction, including money, calendar time, and person hours.

Major Instructional Theories

There are many instructional theories, and they can be categorized according to kinds, paradigms, and domains.

Kinds of Instructional Design Theories

There are several major kinds of design theories related to instruction, including:

Instructional Event Design Theory

This theory addresses what the instruction should be like. This is what most people think of first when the term *instructional theory* is used. This theory deals with instruction.

Instructional Analysis Design Theory

This theory addresses the process of gathering information for making decisions about what the instruction should be like. This information includes information about the learners, what is to be learned, and constraints for the instruction. This theory involves analysis.

Instructional Planning Design Theory

This theory addresses the process of creating the plans for the instruction. This theory deals with design, but *design* is often used to refer to all these kinds of instructional theory collectively—the entire instructional development process.

Instructional Building Design Theory

This theory addresses the process of creating the instructional resources. This theory involves development, but *development* is often used to refer to all these kinds of instructional theory collectively—the entire instructional development process.

Instructional Implementation Design Theory

This theory addresses the process of implementing the instruction, including instructor training, equipment procurement and installation, and even organizational change. This theory deals with implementation.

Instructional Evaluation Design Theory

This theory addresses processes for both formative and summative evaluation of the instruction (not the learner). This theory involves evaluation.

All but the first of these kinds of design theories are parts of what are often called *instructional design* (or *development*) process. Because all these kinds of design theories are about aspects of instruction, they are all instructional theories, though they are not what typically comes to mind when that term is used. Nevertheless, they are all important to instructional practice and research. In fact, it is important to understand that useful guidance for practitioners must integrate *all* of them.

Paradigms of Instructional Design Theories

There are also several paradigms of instructional theories, each fundamentally different from the others. The paradigms are based on Alvin Toffler's description of three waves of societal evolution, each one pushing aside the previous type of society.

The Agrarian Age Paradigm

During the Agrarian Age, the predominant paradigm was based on tutoring and apprenticeships; this paradigm is still used in some settings today. It typically entails one-on-one instruction and activity-based learning. Instructional methods include doing (with guidance and feedback) and showing (with explanations), in that order of frequency. Instructional theories in this paradigm date back centuries (if not millennia) before Socrates.

The Industrial Age Paradigm

During the Industrial Age, the predominant paradigm was based on “batch processing” with lecture, time-based student progress, and norm-referenced assessment. It typically entails teacher-centered, one-to-many, standardized instruction with no peer collaboration. Instructional methods are mostly telling (in person or through texts), with some showing (demonstrations) and doing (for largely inauthentic tasks). Instructional theories in this paradigm date back to the early 1900s.

The Information Age Paradigm

This paradigm is based on active, collaborative, personalized, competency-based, and self-directed learning that takes place in many schools today (and is how students have learned in Montessori schools for over a century). It typically entails task-based instruction (including project- and problem-based learning) with competency-based student progress and assessment. Instructional methods typically include interdisciplinary, authentic, collaborative projects with just-in-time tutorial support from the teacher, peers, or digital systems. The tutorials use doing (practice until a criterion for mastery is met), showing (demonstrations), and telling (explanations, typically in combination with demonstrations). Instructional theories in this paradigm are relatively new, developed largely within the past decade or two.

Domains of Instructional Design Theories

Finally, there are three domains in which instructional design theories have been developed: cognitive, psychomotor, and affective.

Cognitive Domain

Instructional theories in this domain focus on methods to help learners acquire mental skills and knowledge. Although taxonomies have been developed for different purposes by Benjamin Bloom, Robert Gagné, and others, the major differences in instructional methods for the cognitive domain fall into three categories based on type of learning: memorization, understanding, and application.

Theories for Memorization

These address both recall and recognition. They include instructional methods derived from behavioral learning theories (practice with reinforcement/feedback, repetition, chunking, and prompting) and cognitive learning theories (presentations and mnemonics).

Theories for Understanding

These address the development of conceptual, causal, and process understanding. Instructional methods were derived primarily from schema theory. For conceptual understanding, the methods relate new concepts to a learner’s prior knowledge. Methods include context, compare and contrast, analysis, analogy, instantiation, and others. For causal and process understanding, the methods include generality (expository or discovery/confirmatory) and demonstration (observation or exploration/manipulation). For all kinds of understanding, practice applying the understanding in diverse situations is also helpful.

Theories for Application

These address skill development, including concept classification, the use of rules (procedures and principles), and the use of metacognitive skills. Methods of instruction focus on telling how to do it (generality), showing how to do it (demonstration or example), and doing it (practice) with feedback.

Psychomotor Domain

Instructional theories in this domain focus on methods to help learners acquire both reproductive and productive physical skills.

Theories for Reproductive Skills

These are physical movements, such as touch typing, that have little or no variation and are memorized, making them automatic. Their instructional methods are similar to those for memorization in the cognitive domain: practice with reinforcement/feedback, repetition, chunking, and prompting.

Theories for Productive Skills

These are physical movements that have moderate to great variation and require concentration, flexibility, and strategic thinking. Their instructional methods include (a) impart knowledge of what should be done, using experiential, discovery techniques; (b) demonstrate the skill and provide verbal cuing of the steps; (c) provide long, continuous practice sessions with feedback; and (d) develop flow, automatization, and generalization.

Affective Domain

Instructional theories in this domain address emotional, moral, social, spiritual, aesthetic, and motivational development. Each of these kinds of learning has multiple components, including knowledge, skills, and attitudes.

Research Methods to Improve Instructional Theories

In contrast to descriptive theory, which is concerned with validity and truthfulness, design theory is concerned with preferability and usefulness. Thus, it requires very different research methods. Design theory can be advanced by both research to *prove* (confirmatory research, which is most appropriate in the later stages of development of a design theory) and research to *improve* (exploratory or developmental research, which is most appropriate in the earlier stages).

Research to Prove

These research methods include both experimental and quasi-experimental designs.

Experimental Designs

These entail random assignment of students to groups that vary in the instructional methods used. This is typically achieved in controlled or laboratory environments.

Quasi-Experimental Designs

These entail nonrandom assignment to such groups, but typically use statistical methods to adjust for differences in the students from one group to another.

Research to Improve

These research methods focus on developing a new design theory or improving an existing design theory through implementation in authentic contexts. Methods include grounded theory development, design-based research, and formative research.

Grounded Theory Development

Pioneered by Barney Glaser and Anselm Strauss, this research method focuses on inductive processes for theory development, hence the term “grounded.” Much of the guidance concerns coding of data.

Design-Based Research

Unlike grounded theory development, this method is driven by theory and prior research. It requires collaboration between researchers and practitioners in the real-world settings and entails flexible adaptation to improve both theory and practice as the research iteratively unfolds.

Formative Research

This is a kind of developmental or design-based research intended to develop or improve a design theory using a case study approach and formative evaluation techniques. It can be used with designed cases, as with design-based research, or with naturalistic cases (either in vivo or ex post facto) that are within the scope of the design theory.

See also [Active Learning](#); [Constructivist Approach](#); [Design-Based Research](#); [Information Processing Theory](#); [Learning Theories](#); [Mastery Learning](#); [Montessori Schools](#); [Social Learning](#)

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