

# Constructivism: Its Theoretical Underpinnings, Variations, and Implications for Classroom Instruction

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**Abstract:** This article provides an overview of constructivism and its implications for classroom practices. To that end, it first describes the basic features of constructivism along with its major forms or variations. It then elucidates the constructivist view of knowledge, learning, teaching, and the relationship among these constructs. More specifically, it explains the assumptions and principles of constructivist pedagogy, bringing to the fore its core characteristics that differ fundamentally from other instructional paradigms. Last, the article presents how constructivism as a learning theory can guide the process of learning and teaching in real classroom settings.

Learning theories are indispensable for effective and pedagogically meaningful instructional practices. A learning theory provides “clarity, direction and focus throughout the instructional design process.” Hence, an effective instructional framework is supposed to take into account the theoretical bases in which it is grounded (McLeod 2003). Likewise, an educator is expected to understand the educational theory or theories behind a given instructional framework to gain success in reform efforts (Fosnot 1996). Among many different labels, learning theories can be categorized in three main areas: behaviorism, cognitivism, and constructivism. The purpose of this article is to clarify the conceptual underpinnings of constructivism along with its variations and its implications for classroom instruction.

### **Constructivism**

The philosophy of constructivism evolved from dissatisfaction with traditional Western theories of knowledge. As such, it contrasts sharply with objectivist epistemology and positivism (Crotty 1998; Hendry,

Frommer, and Walker 1999; Glasersfeld 1995). In contrast to the objectivist notion of objective truth and meaning inherent in objects, independent of any consciousness, constructivism postulates that knowledge cannot exist outside our minds; truth is not absolute; and knowledge is not discovered but constructed by individuals based on experiences (Crotty 1998, 42; Fosnot 1996; Hendry, Frommer, and Walker 1999). Constructivism replaces the traditional conception of truth—as the correct representation of an external world—with the concept of viability, meaning that descriptions of states or events of the world are relative to the observer (Glasersfeld 1995, 8). The constructivist perspective, therefore, posits that knowledge is not passively received from the world or from authoritative sources but constructed by individuals or groups making sense of their experiential worlds (Maclellan and Soden 2004).

Constructivism advances meaning-making and knowledge construction as its foremost principles (Crotty 1998; Fosnot 1996; Phillips 1995). It views knowledge as temporary, nonobjective, internally constructed, developmental, and socially and culturally mediated (Fosnot 1996). Individuals are assumed to construct their own meanings and understandings, and this process is believed to involve interplay between existing knowledge and beliefs and new knowledge and experiences (Richardson 1997, 2003; Schunk 2004). This view of meaning-making through previously constructed knowledge implies that:

- Learners are intellectually generative individuals (with the capacity to pose questions, solve problems, and construct theories and knowledge) rather than empty vessels waiting to be filled.



- Instruction should be based primarily on developing learners' thinking.
- The locus of intellectual authority resides in neither the teacher nor the resources, but in the discourse facilitated by both teachers and learners (Maclellan and Soden 2004).

### *Domains of Constructivism*

Constructivism is not a single or unified theory; rather, it is characterized by plurality and multiple perspectives. Varied theoretical orientations (Phillips 1995) explicate such different facets of constructivism as cognitive development, social aspects, and the role of context. According to Matthews (2000), the educational literature identifies eighteen different forms of constructivism in terms of methodological, radical, didactic, and dialectical considerations, yet many theorists and scholars place all forms of constructivism in three radically distinct categories: (1) sociological, (2) psychological, and (3) radical constructivism. All three categories share the epistemological assumption that knowledge or meaning is not discovered but constructed by the human mind (Richardson 2003).

Phillips (2000) has defined and explained the attributes of social and psychological constructivism:

*Social constructionism* or *social constructivism*: A theory that bodies of knowledge or disciplines that have been built up are “human constructs, and that the form that knowledge has taken in these fields has been determined by such things as politics, ideologies, values, the exertion of power and the preservation of status, religious beliefs, and economic self-interest.” This approach centers on the ways in which power, the economy, [and] political and social factors affect the ways in which groups of people form understandings and formal knowledge about their world. These bodies of knowledge are not considered to be objective representations of the external world.

*Psychological constructivism*: This approach relates to a developmental or learning theory that suggests that individual learners actively construct the meaning around phenomena, and that these constructions are idiosyncratic, depending in part on the learners' background knowledge. The development of meaning may take place within a social group that affords its individual members the opportunity to share and provide warrant for these meanings. If the individuals within the group come to an agreement about the nature and warrant of a description of a phenomenon or its relationship to others, these meanings become formal knowledge. (p. 6)

*Radical constructivism*, introduced by Ernst von Glasersfeld, assumes that external reality cannot be known and that the knowing subject constructs all knowledge, ranging from everyday observations to scientific knowledge; knowing thus inevitably reflects the perspective of the observer (Molebash 2002; Terhart 2003). According to radical constructivists, it is impossible to judge knowledge as an ontological or metaphysical reality (Terhart 2003). Knowing without metaphysics is possible; meaning exists in the realm of the experiential world and not ontologically, a view called postepistemology (Glasersfeld 1995, 6–7).

Gergen (1995) provides an explanation of radical constructivism by using esoteric terms borrowed from Moshman's (1982) classification of perspectives on constructivism as endogenous, exogenous, and dialectical. The first view emphasizes the individual's knowledge construction based on previous knowledge and experiences; the second, the role of environment or social context in knowledge construction; and the third, the relationship of various types of dynamic interactions between the individual and the environment.

Gergen (1995) distinguishes between two categories of knowledge: *exogenic* (or word centered) and *endogenic* (or mind centered). The exogenic tradition generally embraces a dualism: the existence of an external world (typically a material reality) is set against the existence of a psychological world (cognitive, subjective, symbolic, or phenomenological). Knowledge is achieved when the inner states of the individual reflect or accurately represent the existing states of the external world or when the mind serves as a "mirror of nature." The exogenic theorist views the external world or material world as a given. The endogenic thinker, however, is likely to view the mental world as self-evident. In contrast to the exogenic theorist's concentration on the environment, the endogenic theorist often emphasizes human beings' intrinsic capacities for reason, logic, and conceptual processing. Radical constructivism's endogenic view of knowledge emphasizes the mental processes of individuals and the ways in which they construct knowledge of the world from within. This perspective does not see knowledge as a reflection of the world as it is (p. 18).

### *Constructivist Pedagogy*

Although constructivism is a recently emergent epistemological stance or theory of knowledge and knowing, it has come to inform different bodies of knowledge or disciplines ranging from philosophy to psychology, anthropology, and sociology. Constructivism has implications for pedagogical theory and research as well. Since its inception as an epistemology and philosophy, constructivist theory has prompted educators to build a constructivist pedagogy. Educational scholars have

developed a range of definitions of constructivist learning and its attributes. Rooted in the field of cognitive science, constructivist pedagogy is especially informed by the ideas of John Dewey and William James; the later work of Jean Piaget; and the sociohistorical work of Lev Vygotsky, Jerome Bruner, and Ernst von Glasersfeld, to name a few (Fosnot 1996; Kivinen and Ristele 2003). Its genesis can be traced as far back as the eighteenth-century philosophers Vico and Kant.

Richardson (2003) calls constructivist pedagogy “the creation of classroom environments, activities, and methods that are grounded in a constructivist theory of learning, with goals that focus on individual students developing deep understandings in the subject matter of interest and habits of mind that aid in future learning.” Fosnot (1996) offers this explanation of constructivist learning:

[A] self-regulatory process of struggling with the conflict between existing personal models of the world and discrepant new insights, constructing new representations and models of reality as human meaning-making venture with culturally developed tools and symbols, and further negotiating such meaning through cooperative social activity, discourse, and debate. (p. ix)

As a theory, constructivism proposes that learning is neither a stimulus-response phenomenon nor a passive process of receiving knowledge; instead, as an adaptive activity requiring building conceptual structures and self-regulation through reflection and abstraction, learning is an active process of knowledge construction influenced by how one interacts with and interprets new ideas and events (Lambert et al. 1995; Maclellan and Soden 2004; Glasersfeld 1995). “Individuals bring past experiences and beliefs, as well as their cultural histories and world views, into the process of learning” when they construct knowledge internally by interacting with environment (Kamii, Manning, and Manning 1991). This perspective views developmental stages as constructions of active learner reorganization. Likewise, it sets concept development and “deep” understanding, rather than behaviors or skills, through “authentic” tasks, as the goal of instruction (Fosnot 1996, 10-11).

Piaget’s genetic epistemology or theory of cognitive development provides one of the building blocks of constructivist pedagogy. Drawing on biological concepts such as the concept of equilibrium-disequilibrium, Piaget attempted to explain how learning and the changes in cognitive structures occur (Fosnot 1996; Gillani 2003; Palincsar 1998). From his perspective, intellectual and cognitive development resembles a biological act that requires the organism’s adaptation to environmental demands (Gillani 2003). Behavior and the organism stand as a whole system; thus any changes in one part of the system will cause other changes

as behavior balances the structure of the organism against the characteristics of the environment (Fosnot 1996). Behaviors, Piaget believed, serve as the driving force of developing new cognitive structures.

Piaget believed that an individual encountering a new learning situation draws on prior knowledge to make the new experience understandable (Gillani 2003). A new event, situation, or learning environment can create contradictions with one's previous understandings; their insufficiency leads to perturbation and a state of disequilibrium in the mental schemata, in which generic events and abstract concepts are stored and organized in terms of their common patterns (Fosnot 1996; Gillani 2003; Palincsar 1998). To form a state of equilibrium in the cognitive structure, the individual needs to modify or reorganize his or her schemata via adaptation.

The internal process of restructuring the schemata is accomplished through assimilation and accommodation (Gillani 2003). While assimilation integrates new information with existing knowledge, accommodation modifies or transforms existing cognitive structures in response to a new situation. According to Piaget, learners confronted with an imbalance may resort to three kinds of accommodations (Fosnot 1996): (1) disregarding the contradictions and adhering to their original scheme; (2) vacillating by maintaining the contradictory theories simultaneously and viewing each theory as separate or specific cases; or (3) forming a new, modified notion to explain and resolve the prior contradiction. In each type of response, the learner's internal and self-regulatory behavior leads to the compensations (p. 16).

Glaserfeld (1996) explains Piaget's theory in terms of its epistemological underpinnings. The application of the Piagetian notion of adaptation to cognitive structures implies that knowledge is not a representation of external reality but a map of actions and conceptual operations. Knowledge springs from (a) the person's "actions," which are grounded in and directed at objects in an environment, and (b) his or her "reflection" on objects, which embody the person's experiential world (pp. 3-4).

Apart from Piaget's genetic epistemology, learners can also be classified as absolute, transitional, independent, and contextual in terms of epistemological viewpoints (Baxter Magolda 1992). The absolute learner believes that (a) knowledge is fixed, absolute, and certain; (b) teachers and textbooks have the right answer; (c) the student has a duty to get it right; and (d) teachers should make it easier to find out what is expected. In contrast, a contextual learner (a) believes that knowledge is uncertain, tentative, and subject to change and revision; (b) is comfortable judging how personal knowledge and skills might apply to a situation; and (c) connects concepts to applied settings. Practicing constructivist teaching methods, teachers can transform students from absolute learners to contextual learners.

Vygotsky's theories come into play in shaping constructivist pedagogy. Slavin (2000) states:

Four key principles derived from Vygotsky's ideas have played an important role [in modern constructivist thought]. Two of them are very important for cooperative learning. First is his emphasis on the social nature of learning. Children learn, he proposed, through joint interactions with adults and more capable peers. On cooperative projects children are exposed to their peers' thinking processes; this method not only makes the learning outcome available to all students, but also makes other students' thinking processes available to all. Vygotsky noted that successful problem solvers talk themselves through difficult problems. In cooperative groups, children can hear this inner speech out loud and can learn how successful problem solvers are thinking through their approaches. The second key concept is the idea that children learn best the concepts that are in their zone of proximal development. When children are working together, each child is likely to have a peer performing on a given task at a slightly higher cognitive level, exactly within the child's zone of proximal development. (p. 256)

Constructivist theory is descriptive rather than prescriptive; it does not prescribe rigid rules or procedures for designing a learning environment (Wasson 1996). Because the constructivist view of learning evolved from cognitivism, it shares several similarities with cognitive learning theories. What distinguishes constructivism from cognitivism is the notion that "knowledge does not and cannot have the purpose of producing an independent reality, but instead . . . has an adaptive function" (Glaserfeld 1995, 3).

The basic assumptions and principles of the constructivist view of learning can be summarized as follows:

- Learning is an active process.
- Learning is an adaptive activity.
- Learning is situated in the context in which it occurs.
- Knowledge is not innate, passively absorbed, or invented but constructed by the learner.
- All knowledge is personal and idiosyncratic.
- All knowledge is socially constructed.
- Learning is essentially a process of making sense of the world.
- Experience and prior understanding play a role in learning.
- Social interaction plays a role in learning.

- Effective learning requires meaningful, open-ended, challenging problems for the learner to solve. (Boethel and Dimock 2000; Fox 2001)

Fosnot (1996) suggests that several general principles of the constructivist view of learning can be applied to educational practices (see Figure 1):

- *Learning is not the result of development; learning is development.* It requires invention and self-organization on the learner's part. Teachers should thus allow learners to raise their own questions, generate their own hypotheses and models as possibilities, and test them for viability.
- *Disequilibrium facilitates learning.* "Errors" should be perceived as a result of learners' conceptions and therefore not minimized or avoided. Challenging, open-ended investigations in realistic, meaningful contexts will allow learners to explore and generate many possibilities, whether affirming or contradictory. Contradictions, in particular, need to be illuminated, explored, and discussed.
- *Reflective abstraction is the driving force of learning.* As meaning-makers, humans seek to organize and generalize across experiences in representational form. Reflection through journals, representation in multisymbolic form, or connections made across experiences or strategies may facilitate reflective abstraction.
- *Dialogue within a community engenders further thinking.* The classroom should be a "community of discourse engaged in activity, reflection, and conversation." Learners (rather than teachers) are responsible for defending, proving, justifying, and communicating their ideas to the classroom community. Ideas are accepted as truth only as they make sense to the community and thus rise to the level of "taken-as-shared."
- *Learning proceeds toward developing structures.* As learners struggle to make meanings, they undertake progressive structural shifts in perspectives—in a sense, "big ideas." These learner-constructed, central-organizing ideas can be generalized across experiences, and they often require undoing or reorganizing earlier conceptions. This process continues throughout development. (pp. 29–30)

## Implications of the Constructivist Framework for Classroom Teaching

Constructivism is a theory of learning, not a theory of teaching (Fosnot 1996; Richardson 2003). For this reason, although there is an enormous body of literature on constructivism, the elements of effective



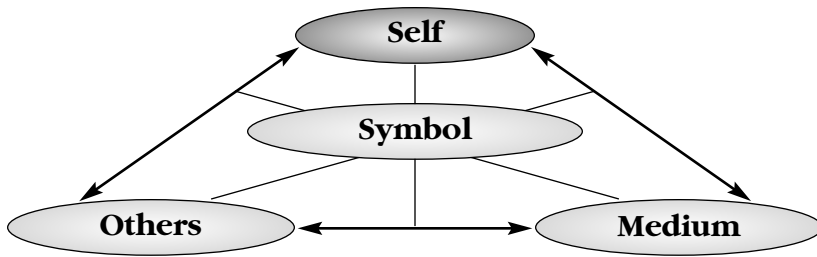


Figure 1. *Constructivist Learning Model* (source: Fosnot 1996)

constructivist teaching are not known (Richardson 2003). Constructivist teaching theory, built on constructivist learning theory, is a set of prescriptions that challenge the transmission or behaviorist paradigms advocated in many education programs. Experiential learning, self-directed learning, discovery learning, inquiry training, problem-based learning, and reflective practice are examples of constructivist learning models (Gillani 2003; McLeod 2003; Slavin 2000).

Constructivism is explained in terms of its relation to teaching. According to Fosnot (1996), teaching based on constructivism discounts the idea that symbols or concepts can be taken apart as discrete entities and taught out of context. Rather, constructivist teaching affords learners meaningful, concrete experiences in which they can look for patterns, construct their own questions, and structure their own models, concepts, and strategies. The classroom becomes a micro-society in which learners jointly engage in activity, discourse, and reflection. Teachers facilitate and guide rather than dictate autocratically. Autonomy, mutual reciprocity of social relations, and empowerment characterize a constructively conducted classroom (Fosnot 1996, pp. ix-x). Students can develop in-depth understandings of the instructional materials, understand the nature of knowledge construction, and construct complex cognitive maps to connect bodies of knowledge and understandings (Richardson 2003).

Because meaning, knowledge, and conceptual structures are constructed differently by each individual, teachers should be cognizant that students may view curricula, textbooks, didactic props, and microworlds differently than they do. Accordingly, teachers should not attempt to transfer conceptual knowledge to students through words (Glaserfeld 1995); instead, they should be concerned with how learners understand the process of knowing and how they justify their beliefs (McLeod 2003). Constructivist teachers challenge students to justify and defend their positions so that they can change their conceptual frameworks (e.g., beliefs, assumptions, and conceptions). In the constructivist classroom, learning emphasizes the process, not the product. How one

arrives at a particular answer is what matters. The teacher also recognizes the pivotal importance of discourse.

Richardson (2003) identifies several principles as the premises of the constructivist pedagogy. These principles suggest that the teacher first recognize and respect students' backgrounds, beliefs, assumptions, and prior knowledge; provide abundant opportunities for group dialogue aimed at fostering shared understanding of the topic under study; establish a learning environment that encourages students to examine, change, and even challenge their existing beliefs and understandings through meaningful, stimulating, interesting, and relevant instructional tasks; help students develop meta-awareness of their own understandings and learning processes; and introduce the formal domain of knowledge or subject matter into the conversation through a sort of loosely structured instruction and the use of technological tools such as Web sites.

Other educators have also attempted to elaborate on the characteristics of constructivist teaching and learning. Brooks and Brooks (1993) describe both the pillars of constructivist pedagogy and the characteristics of constructivist teaching practices in *In Search of Understanding: The Case for Constructivist Classrooms*, which remains one of the most-cited books on the constructivist approach to teaching. The authors enumerate five pillars on which constructivist classrooms are based: (1) posing problems of emerging relevance to learners; (2) structuring learning around primary concepts; (3) seeking and valuing students' points of view; (4) adapting curricula to address students' suppositions; and (5) assessing student learning in the context of teaching. Translating these principles into instructional practices, these authors argue that teachers in a constructively planned and conducted classroom environment should have students engage in raw data or primary sources, aiming to develop students' cognitive and higher-order thinking skills. Taking into account students' concepts, misconceptions, modes of thinking, and responses, these teachers accordingly shift their teaching methods or content when needed. By asking thoughtful and open-ended questions, constructivist teachers also encourage students to elaborate on their initial responses through such interactive methods as discussion, debate, and Socratic dialogue.

## Conclusion

Constructivist theories are of great value to teachers in their efforts to help students grasp the substantive and syntactic components of the subjects they are teaching. This article has explained constructivism in terms of its epistemological, philosophical, and theoretical underpinnings, and its implications for instructional practices. Even though the constructivist view of learning and teaching has dominated the educational literature for more than two decades, constructivist pedagogy in its entirety has not yet

penetrated actual classrooms. It should be kept in mind that putting constructivist pedagogical ideas into practice effectively and with integrity first necessitates teachers' willingness to embrace and practice principles of constructivist pedagogy. And doing so in turn requires teachers to examine their deeply held philosophies of teaching—more precisely, their conceptions of teaching—to become conscious of whether they tend to value traditional teacher-centered or constructivist learner-centered conceptions of teaching. Rather than examine technical aspects of teaching, they first can reflect on and formulate their answers to such important conceptual questions as how learning occurs; how the teacher can facilitate the learning process or what roles the teacher should play in student learning; what kinds of learning environments help realize the goals of schooling in general and of school subjects in particular; and how students' learning should be evaluated.

If the goals of teaching school subjects are to be successfully accomplished, teachers of different subject areas should transform students' engagement in subject matters from rote recall and comprehension to more meaningful analysis, synthesis, application, and evaluation via constructivist teaching models and methods.

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