

Learning: Theory and Research

Cognitive Constructivism

Cognitivist teaching methods aim to assist students in assimilating new information to existing knowledge, and enabling them to make the appropriate modifications to their existing intellectual framework to accommodate that information.

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Background

Dissatisfaction with behaviorism's strict focus on observable behavior led educational psychologists such as Jean Piaget and William Perry to demand an approach to learning theory that paid more attention to what went on "inside the learner's head." They developed a cognitive approach that focused on mental processes rather than observable behavior. Common to most cognitivist approaches is the idea that knowledge comprises symbolic mental representations, such as propositions and images, together with a mechanism that operates on those representations. Knowledge is seen as something that is actively constructed by learners based on their existing cognitive structures. Therefore, learning is relative to their stage of cognitive development; understanding the learner's existing intellectual framework is central to understanding the learning process.

View of Knowledge

While behaviorists maintain that knowledge is a passively absorbed behavioral repertoire, cognitive constructivists argue instead that knowledge is actively constructed by learners and that any account of knowledge makes essential references to cognitive structures. Knowledge comprises active systems of intentional mental representations derived from past learning experiences. Each learner interprets experiences and information in the light of their extant knowledge, their stage of cognitive development, their cultural background, their personal history, and so forth. Learners use these factors to organize their experience and to select and transform new information. Knowledge is therefore actively constructed by the learner rather than passively absorbed; it is essentially dependent on the standpoint from which the learner approaches it.

View of Learning

Because knowledge is actively constructed, learning is presented as a process of active discovery. The role of the instructor is not to drill knowledge into students through consistent repetition, or to goad them into learning through carefully employed rewards and punishments. Rather, the role of the teacher is to facilitate discovery by providing the necessary resources and by guiding learners as they attempt to assimilate new knowledge to old and to modify the old to accommodate the new. Teachers must thus take into account the knowledge that the learner currently possesses when deciding how to construct the curriculum and to present, sequence, and structure new material.

View of Motivation

Unlike behaviorist learning theory, where learners are thought to be motivated by extrinsic factors such as rewards and punishment, cognitive learning theory sees motivation as largely intrinsic. Because it involves significant restructuring of existing cognitive structures, successful learning requires a major personal investment on the part of the learner (Perry 1999, 54). Learners must face up to the limitations of their existing knowledge and accept the need to modify or abandon existing beliefs. Without some kind of internal drive on the part of the learner to do so, external rewards and punishments such as grades are unlikely to be sufficient.

Implications for Teaching

Cognitivist teaching methods aim to assist students in assimilating new information to existing knowledge, and enabling them to make the appropriate modifications to their existing intellectual framework to accommodate that information. Thus, while cognitivists allow for the use of “skill and drill” exercises in the memorization of facts, formulae, and lists, they place greater importance on strategies that help students to actively assimilate and accommodate new material. For instance, asking students to explain new material in their own words can assist them in assimilating it by forcing them to re-express the new ideas in their existing vocabulary. Likewise, providing students with sets of questions to structure their reading makes it easier for them to relate it to previous material by highlighting certain parts and to accommodate the new material by providing a clear organizational structure. Because learning is largely self-motivated in the cognitivist framework, cognitivists such as A. L. Brown and J. D. Ferrara have also suggested methods which require students to monitor their own learning. For instance, the use of ungraded tests and study questions enables students to monitor their own understanding of the material. Other methods that have been suggested include the use of learning journals by students to monitor progress and highlight any recurring difficulties, and to analyze study habits.

Jean Piaget

The most influential exponent of cognitivism was Swiss child psychologist Jean Piaget. Piaget rejected the idea that learning was the passive assimilation of given knowledge. Instead, he proposed that learning is a dynamic process comprising successive stages of adaption to reality during which learners actively construct knowledge by creating and testing their own theories of the world (1968, 8). Piaget’s theory has two main strands: first, an account of the mechanisms by which cognitive development takes place; and second, an account of the four main stages of cognitive development through which children pass.

The basic principle underlying Piaget’s theory is the principle of equilibration: all

cognitive development (including both intellectual and affective development) progresses towards increasingly complex and stable levels of organization. Equilibration takes place through a process of adaptation, that is, assimilation of new information to existing cognitive structures and the accommodation of that information through the formation of new cognitive structures. For example, learners who already have the cognitive structures necessary to solve percentage problems in mathematics will have some of the structures necessary to solve time-rate-distance problems, but they will need to modify their existing structures to accommodate the newly acquired information to solve the new type of problem. Thus, learners adapt and develop by assimilating and accommodating new information into existing cognitive structures.

Piaget suggested that there are four main stages in the cognitive development of children. In the first two years, children pass through a sensorimotor stage during which they progress from cognitive structures dominated by instinctual drives and undifferentiated emotions to more organized systems of concrete concepts, differentiated emotions, and their first external affective fixations. At this stage, children's outlook is essentially egocentric in the sense that they are unable to take into account others' points of view. The second stage of development lasts until around seven years of age. Children begin to use language to make sense of reality. They learn to classify objects using different criteria and to manipulate numbers. Children's increasing linguistic skills open the way for greater socialization of action and communication with others. From the ages of seven to twelve years, children begin to develop logic, although they can only perform logical operations on concrete objects and events. In adolescence, children enter the formal operational stage, which continues throughout the rest of their lives. Children develop the ability to perform abstract intellectual operations, and reach affective and intellectual maturity. They learn how to formulate and test abstract hypotheses without referring to concrete objects. Most importantly, children develop the capacity to appreciate others' points of view as well as their own.

Piaget's theory was widely accepted from the 1950s until the 1970s. Although the theory is not now as widely accepted, it has had a significant influence on later theories of cognitive development. For instance, the idea of adaptation through assimilation and accommodation is still widely accepted.

William G. Perry

William G. Perry, an educational researcher at Harvard University, developed an account of the cognitive and intellectual development of college-age students through a fifteen-year study of students at Harvard and Radcliffe in the 1950s and 1960s. Perry generalized that study to give a more detailed account of post-adolescent development than did Piaget. He also introduces the concept of positionality and develops a less static view of developmental transitions.

The sequence of cognitive structures that make up the developmental process may be described in terms of cross-sections of cognitive structures representative of different stages in the developmental sequence. Each stage is construed as a relatively stable, enduring cognitive structure, which includes and builds upon past structures. Stages are characterized by the coherence and consistency of the structures that compose them. The transition between stages is mediated by less stable, less consistent transitional structures. Freud, Whitehead, and Piaget all use the notion of a stage in this way. Perry rejects the notion of a stage. He argues that construing development in terms of a sequence of stable stages in which students are "imprisoned" is too static

(Perry 1999, xii). Instead, he introduces the notion of a position. Perry accepted Piaget's claim that learners adapt and develop by assimilating and accommodating new information into existing cognitive structures. He also accepted Piaget's claim that the sequence of cognitive structures that constitute the developmental process are both logically and hierarchically related, insofar as each builds upon and thus presupposes the previous structure. However, he laid far greater emphasis on the idea that learners approach knowledge from a variety of different standpoints. Thus, according to Perry, gender, race, culture, and socioeconomic class influence our approach to learning just as much as our stage of cognitive development (xii). We each interpret the world from a different position (46) and each person may occupy several positions simultaneously with respect to different subjects and experiences (xii). The developmental process is a constantly changing series of transitions between various positions.

Perry provides the following illustration different types of position (1999, 2):

... a lecturer announces that today he will consider three theories explanatory of _____.

Student A has always taken it for granted that knowledge consists of correct answers, that there is one right answer per problem, and that teachers explain these answers for students to learn. He therefore listens for the lecturer to state which theory to learn.

Student B makes the same general assumptions but with an elaboration to the effect that teachers sometimes present problems and procedures, rather than answers, "so that we can learn to find the right answer on our own..."

Student C assumes that an answer can be called "right" only in the light of its context, and that contexts or "frames of reference" differ...

Whatever the lecturer then proceeds to do..., these three students will make meaning of the experience in different ways which will involve different assessments of their own choices and responsibilities.

Perry identifies nine basic positions, of which the three major positions are duality, multiplicity, and commitment.

The most basic position is **duality**. The world, knowledge and morality are assumed to have a dualistic structure. Things are right or wrong, true or false, good or bad. Students see teachers as authority figures who impart right answers and "the truth." The role of the student is seen as being to receive those answers and demonstrate that they have learned them. Detachment is difficult in this because there is only a single, correct point of view. Most students have passed beyond this stage by the time that they arrive in university. Those who have not quickly do so in the inherently pluralistic culture of modern universities.

Positions two through four are largely transitional. Learners gradually develop an increased recognition of multiplicity but still assimilate that multiplicity to the fundamentally dualistic framework of the first position. For instance, a student may recognize the existence of a multiplicity of different points of view in the university but still look for the point of view that the teacher "wants us to learn" (121).

The next major position is **multiplicity**. The world, knowledge and morality are accepted as relativistic in the sense that truth is

seen as relative to a frame of reference rather than absolute. Learners recognize that things can only be said to be right or wrong within a specific context. Teachers are seen as expert guides or consultants rather than as authority figures who impart “the truth.” Peers are accepted as legitimate sources of learning (xxxii). This position involves a much more extensive restructuring of the learner’s existing knowledge than previous positions as knowledge can no longer be assimilated to the existing dualistic organizational scheme.

Positions six through eight are also largely transitional. Recognition of the relativity of knowledge leads to the realization that a stable locus or point of view is necessary for a sense of identity and to give some feeling of continuity. This leads to the gradual formation of commitments to certain points of view, relationships, sorts of activities, etc. The learner realizes the necessity to find his own point of view in a relativistic world. He or she begins by questioning and reconsidering past beliefs and commitments, then develops and expands upon firm commitments regarding important areas of life and knowledge.

The final major position is **commitment**. The commitments that the learners have developed together with their recognition that all knowledge is relative, leads to the realization both that each person partly determines his or her own fate and the recognition that commitments, and hence identity, are constantly evolving.

Because Perry’s initial research was based on a small and fairly non-representative sample of students, many of the details of his positions have been modified or developed by later researchers. However, the idea of positionality has had a significant influence on social identity theory and his account of developmental transitions is consonant with current approaches to adult learning (xii).

References

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