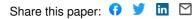# Constructivism in education. — **Source link** ⧉

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Topics: Constructivism (philosophy of education), Social constructivism, Constructivist teaching methods, Science education and Social constructionism

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Constructivism in Education

Constructivism is a theory of knowledge with roots in philosophy, psychology, and cybernetics. It asserts two main principles whose application has far-reaching consequences for the study of cognitive development and learning as well as for the practice of teaching, psychotherapy, and interpersonal management in general. The two principles are:

(1) knowledge is not passively received but actively built up by the cognizing subject;

(2) the function of cognition is adaptive and serves the organization of the experiential world, not the discovery of ontological reality.

To accept only the first principle is considered trivial Constructivism by those who accept both, because that principle has been known since Socrates and, without the help of the second, runs into all the perennial problems of Western epistemology.

The present flourishing of Constructivism owes much to physics and the philosophy of science (Hanson, Kuhn, Lakatos, Barnes) and the concomitant interest in the sceptical core of 18th-century empiricism. Constructivism has as yet only an implicit relation with the constructivist approach to the foundations of mathematics (Lorenzen, Brouwer, Heyting).

The first explicit formulation of a constructivist theory of knowledge was proposed by Giambattista VICO in his little-known Latin treatise *De antiquissima Italorum sapientia* (1710). He coined the phrase "verum est ipsum factum" and explained that to know something means to know what parts it is made of and how they have been put together. Objective, ontological reality, therefore, may be known to God, who constructed it, but not to a human who has access only to subjective experience. "God," Vico wrote, "is the artificer of nature, man the god of artifacts" (1710/1858; p. 122).

In modern psychology, the notion of cognitive construction was first forged into a major component of developmental theory by James Mark BALDWIN (1861–1934) and Jean PIAGET (1896–1980). Almost certainly unaware of Vico's treatise, they set out from a Kantian position and endeavored to map the procedures and operations by means of which the human subject, having access only to sensation and to the operations of the mind, constructs a relatively stable experiential world. "L'intelligence organise le monde en s'organisant elle-même" (Piaget 1937, p. 311).

Both Baldwin and Piaget could draw on a source that had not been available to Kant and Vico—the theory of evolution. Already William JAMES (1880) and Georg

SIMMEL (1895) had forcefully suggested that the function of the cognitive capability was adaptive, i.e., it was not to produce a 'true' picture of the 'real' world, but rather to enhance the organism's management of experience. This enabled them to avoid Kant's assumption of a priori categories: "... also the forms of thought, that create our conception of the world, result from the practical con-sequences and reactions which shape our mental constitution, just like our physical one, according to evolutionary requirements" (Simmel 1895, p. 45).

The revolutionary aspect of Constructivism lies in the assertion that knowledge cannot and need not be 'true' in the sense that it matches ontological reality, it only has to be 'viable' in the sense that it fits within the experiential constraints that limit the cognizing organism's possibilities of acting and thinking.

Cybernetics and control theory, being concerned with self-regulating systems, have developed a similar approach to cognition according to which adaptation to the environment and a viable conception of the world must and can be constructed from input of 'information'. (Maturana & Varela 1980; von Foerster 1985)

Another source of Constructivism was the analysis of communication and language stimulated by computer science. SHANNON's mathematical theory (1948) confirmed that only directives of choice and combination could travel between communicators, but not the meanings that have to be selected and combined to interpret a message. Language users, therefore, build up their meanings on the basis of their individual experience, and the meanings remain subjective, no matter how much they become modified and homogenized through the subject's interactions with other language users. From the constructivist point of view, meanings are conceptual structures and, as such, to a large extent influence the individual's construction and organization of his or her experiential reality.

At present the constructivist approach has had most impact on psychotherapy and the empirical study of literature. Among family therapists, for instance, the notion that every individual constructs his or her own experiential reality has led to the realization that, in order to eliminate interactional conflicts, subjective constructs must be modified, rather than elements of an 'objective' situation. (Elkaïm, 1983; Keeney, 1983)

In literary studies, the realization that meanings are not materially inherent in words or texts but have to be supplied by readers from their individual stores of experiential abstractions has drawn attention to the fact that interpretations are necessarily subjective and that the source of interpersonal agreement concerning an author's intentions must be found in the construction of a consensual domain. (Schmidt 1983)

The students' subjective interpretation of texts and teachers' discourse, and thus the subjective view of linguistically presented problems is increasingly being taken into account in educational practice and research. Such a constructivist perspective has noteworthy consequences (von Glasersfeld 1983):

(1) There will be a radical separation between educational procedures that aim at generating understanding ('teaching') and those that merely aim at the repetition of behaviors ('training').

(2) The researcher's and to some extent also the educator's interest will be focused on what can be inferred to be going on inside the student's head, rather than on overt 'responses'.

(3) The teacher will realize that knowledge cannot be transferred to the student by linguistic communication but that language can be used as a tool in a process of guiding the student's construction.

(4) The teacher will try to maintain the view that students are attempting to make sense in their experiential world. Hence he or she will be interested in students' 'errors' and, indeed, in every instance where students deviate from the teacher's expected path because it is these deviations that throw light on how the students, at that point in their development, are organizing their experiential world.

(5) This last point is crucial also for educational research and has led to the development of the Teaching Experiment, an extension of Piaget's clinical method, that aims not only at inferring the student's conceptual structures and operations but also at finding ways and means of modifying them. (Steffe 1983)

References

Baldwin J M 1902 Development and evolution. Macmilan, London.

Baldwin J M 1906-1911 Thought and things or genetic logic (3 vols.) Macmillan, New York.

Elkaïm M 1983 Psychothérapie et reconstruction du réel. Editions Universitaires, Bruxelles.

Foerster H v. 1985 Entdecken oder erfinden—wie läßt sich Verstehen verstehen? In H Gumin & A Mohler (Eds.) Einführung in den Konstruktivismus. (27-68) Oldenbourg, München.

Glasersfeld E v. 1983 Learning as a constructive activity. In Proceedings of PME-NA, Montreal, Canada. (Reprinted in C Janvier (Ed.) 1987, Problems of representation in the teaching and learning of mathematics (3-17). Lawrence Erlbaum, Hillsdale, N.J.)

Gumin H & Mohler A (Eds.) 1985 Einführung in den Konstruktivismus. Oldenbourg, München.

James W 1880 Great men, great thoughts, and the environment. Atlantic Monthly, 46, 441-459.

Keeney B P 1983 Aesthetics of change. Guilford Press, New York.

Maturana H R & Varela F J 1980 Autopoiesis and cognition. Reidel, Dordrecht, Holland.

Piaget J 1937 La construction du réel chez l'enfant. Delachaux et Niestle, Neuchatel.

Schmidt S J 1983 The empirical science of literature: A new paradigm. Poetics, 12, 19-34.

Shannon C E 1948 The mathematical theory of communication. Bell Systems Technical Journal, 27, 379-423, 623-656.

Simmel G 1895 Ueber eine Beziehung der Selectionslehre zur Erkenntnistheorie. Archiv für systematische Philosophie, 1, 34-45.

Steffe L P 1983 The teaching experiment methodology in a constructivist research program. In M Zweng et al. (Eds.) Proceedings of 4th International Congress on Mathematical Education. Birkhäuser, Boston.

Vico, G.-B 1710 De antiquissima Italorum sapientia. Stamperia de Classici Latini, Naples, 1858.

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