

Perspectives in Learning and Cognition from History of Epistemology

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ABSTRACT

When perspectives in learning and cognition are articulated, their epistemological and ontological assumptions are not made explicit. Even if they are explicated they are not sufficiently detailed.

This theoretical essay seeks to establish such links between learning and its epistemological roots. It addresses the under asked question: How do current learning and cognition theories relate to the history of epistemology? It examines some of the modern theories in learning and cognition with reference to the epistemological underpinnings derived from Plato's theory of knowledge. A case is made that the label Platonism may or may not apply meaningfully to a learning theory.

Learning and Epistemology

I typically commence a course in learning and cognition for an undergraduate programme of education that I teach with the topic history of epistemology. The students always snap back: What does learning theory have to do with epistemology more so with its history? They promptly point out that neither the recommended readings nor the standard texts of the field have even a chapter devoted to such a topic.

This is sardonic as the relationship between epistemology and education is a direct and unambiguous one. A theory of knowledge is the distinctive component of any educational theory. That there is a

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close relationship between an educator's preferred epistemology and educational theory (and practice) is an established idea (Descartes, 1971; Cornwall, 1991). Any educational philosophy is an endeavour to achieve certain epistemological goals. From what an educator believes about knowledge certain things follow about the nature and goals of education (Cornwall, 1991; Glaserfeld, 1995).

Enquiry into the nature and source of knowledge has concerned philosophers since ancient times and the history of epistemology is almost as aged as the history of human civilisation. The nature of human knowledge has continued to draw a rich variety of conceptualisation chronologically by philosophers, psychologists and educators. With the evolution of modern psychology, philosophy of the mind developed as an important area of philosophical psychology. It asked the question: How does knowledge become possible? What is its source? What is the role played by the mind in this process?

Be that as it may be as is mentioned in the opening paragraph of this paper that when perspectives in learning and cognition are articulated their epistemological and ontological assumptions are not made much explicit. If they are explicated they are not sufficiently detailed. The trifling epistemological debate that exists in the field of learning and cognition is inadequately located on the rationalism-empiricism or objectivism-constructivism continuum. The rationalism versus empiricism framework has been adopted in the chapterisation of some popular texts in the field (Hergenhahn and Olson, 2008; Schunk, 2007; Lefrancois 2006; Bower and Hilgard, 1986). Some works culminate on the objectivist-constructivist continuum (Driscoll, 2000; Jonassen, 1991). Others employ an endogenic-exogenous dichotomy (Glaserfeld, E. 1995). The epistemological considerations underlying only the dominant approaches in learning theory—classical behavioural, early cognitivist and piagetian—are examined by and large. The underlying epistemology of most major positions of twentieth century learning theory and the newer sociocultural perspectives is not illuminated. It is for this reason that the present paper is weakened by very few references if any to previous work in this area.

The goal of this theoretical essay is to establish such links between psychological theories of learning and its epistemological roots. It addresses the under asked question: How do current learning and cognition theories relate to the history of epistemology?

According to the twentieth century philosopher A.N. Whitehead the entire western philosophy can be written as a series of footnotes to

Plato. In this paper Plato's¹ philosophical position about knowledge, in particular his theory of forms is analysed and its application to some of the relatively current theories, practice and issues in learning and cognition is presented. It is beyond the scope of a single work to take into account in historical perspective the epistemological, pedagogical and curricular issues pertaining to older and newer theoretical models of learning and cognition. However this paper attempts to put forth a perspective from the vantage point of history of epistemology. This can offer meaningful possibilities regarding further theorisation and research for psychological studies in education.

Plato's theory of forms

An important concern of Plato's time (427–348 B.C.) was the relationship between that which is eternal, immutable reality and the one that 'flows' and is thus ephemeral. Plato distinguished between these two arguing for two orders of reality. The first order being the one that is perceived by the senses. All the things in this were non-permanent and flowed. In this region were the things that come to be for a while and then pass away. The other order which he regards as the ultimate reality is the realm of forms, the world of ideas. This cannot be perceived by the senses but has eternal, immutable, immaterial, abstract entities. It contained the changeless patterns behind the various phenomena's taking place in nature. According to him ultimate reality consisted of these immaterial abstract ideas rather than their physically discernible counterparts. He uses the terms *the intelligible* and *the visible* for these two ontological orders (Plato, 1987, 474–478).¹

His conception of the nature of man was characterised by a similar dualism. Man was regarded as having a body and a soul. The body corresponded to the region of reality that 'flowed' and was circumscribed to the sensory world while the soul which was immutable corresponded to the region of reality that was eternal. The body was regarded as the instrument of sensory experience. The soul housed the superlative human faculty, reason and could thus survey the world of ideas.

His epistemological tenets parallel his ontological assumptions and those about the nature of man. To him true knowledge was not

¹ The version of *The Republic* consulted is the translation of the Oxford text by Desmond Lee. It is customary to cite Plato's works by reference to the page numbers of an earlier Stephanus edition of 1578. The page numbers in this paper refer to the former.

imaginable of anything that was ephemeral. Since the world of senses comprised this dimension of reality it could not be perfectly known. The metaphor of the soap bubble which bursts before one has even had five seconds to study it in depth and therefore it cannot be known about illustrates this imperfection. The physically existent soap bubble was thus an imperfect copy of the real one which is an abstraction existing in the knower's mind. The empirically observable physical entities are impecunious copies of the true reality namely the forms. Only imperfect knowledge of such things is possible.

Plato did not even regard such knowledge as knowledge but merely opinion. He suggested four divisions along a line of pure knowledge, reason, belief and illusion. Of these he classes the first two as knowledge, situating them in the world of reality while the latter two namely belief and illusion are grouped as opinion and situated in the visible world of becoming. The two-fold order of reality is isomorphised to knowledge and opinion respectively (Ibid, 534). The sensory world and its experience had no role to play in the origin or development of knowledge since the true reality underlying the sensory world was ideas which were eternal. Plato did not necessarily negate the sensory reality of what he called the visible but accorded it a low ontological status. It was capable of giving rise to mere opinion and not knowledge. Thus knowledge could be only of things that can be understood through reason. He explains, "You see, there are some perceptions which don't call for any further exercise of thought, because sensation can judge them adequately, but others which demand the exercise of thought because sensation cannot give a trustworthy result" (Ibid, 523).

Plato broadly prioritised reason as the fundamental reality located in the mind rather than in material objects. In his theory of knowledge, reason is superior to experience as a source of knowledge we know by reason alone. A Platonic form is metaphysically superior as it is autonomous of the senses, perfect, eternal, unchanging and a higher degree of being (Carruthers, 1992). In Plato's own words "When the mind's eye is fixed on objects illuminated by truth and reality, it knows them...but when it is fixed on the twilight word of change... it can only have opinions." (Plato, 1987, 308).

Learning as apprehending 'forms': A Platonism

Plato (Ibid, 532) writes

"So when one tries to get at what each thing is in itself by the exercise of the dialectic, relying on reason without any aid from the senses,

and refuses to give up until one has grasped by pure thought what the good is in itself, one is at the summit of the intellectual realm, as the man who has looked at the sun was of the visual realm.”

The forms are the abstractions underlying the objects in the physical world. It is through his general theory of forms that the distinction in the metaphorical line between knowledge and reason as opposed to belief and illusion is made. The form can be appropriated through reason alone as it belongs to the realm of pure rationality. If viewed in this light—What is learning? It is getting to know the forms. The purpose of learning includes provoking the mind to thought and uncovering this beauty of reason on having received the forms.

What is the content of such learning? It is carefully chosen works like mathematics, logic, dialectics, poetry and the arts that need to form the content of learning. They cause a training of doing proper enquiry into the abstract ‘forms’ or ideas. This is the knowledge with reason as its source and the forms as the content.

Plato considered mathematics especially consequential as it was the eternal truth, the real realm of ideas that never changed. An example of the mathematical state is the idea of number which is eternal, immaterial, abstract entity. It can be apprehended by reason, and reason alone. Subjects like mathematics were the tool for the cultivation of reason and knowledge. Learning of such ‘knowledge’ reorients the mind from the twilight of mundane empiricity to the brilliant daylight of true reason.

Platonism and Cognitivism

An early example of Platonism in a modern cognitive position is Gestalt theory (Kohler, 1929; Wertheimer, 1959). The Gestalt principles of organisation explain psychological phenomenon like learning and cognition in terms of the mind, its functioning and its perceptual properties. As an example consider the Gestalt law of proximity. This law states that objects that are close together will be perceived as a group. A learner naturally tends to perceive six dots as three groups of two dots rather than as six unrelated dots. The three groups of dots so perceived are a formation of the mind. They are the abstraction (form) underlying the physical world of six unrelated dots. Thinking, insight and problem-solving are the attributes of the mind which make the knowledge possible without sensory experience.

Another striking influence of Platonism in modern cognitive theory is evident in the seminal information processing views of learning (Newell and Simon, 1972) especially its complexity (Carruthers, 1992).

The view assumes man to be a composite mental system analogous to a complex computer. Akin to Platonic innatism it emphasises human thought processes specifically the intellectual process by which knowledge becomes possible from sensory data. Though the mind is considered to take in information from the outside world, there are control processes which determine how and when the information will flow through them. These include encoding which involves apart from taking in information, organising it in relation to what you know. They also include storage which is holding on to this information, 'forms' of the mind. The processes are quite complex with many intervening variables in between. When information is entered into the mental computer (learner) it gets stored in various categories. It is then moved around according to the rules.

According to the information processing approach, knowledge (forms that the knower has already appropriated) plays a vital role in learning. It determines what we attend to, perceive, learn, remember and forget. The knower brings his previous knowledge into the new situation. Learning is influenced by elaboration, which is to add meaning by connecting new information to existing knowledge. It is also influenced by organisation and context. These involve ordering the networks of information and associating a physical/ emotional/ some other backdrop with it.

Both Gestalt theory and the information processing approach to learning are among the major influences leading up to what was in later days called the cognitive revolution. This revolution was a trend of emphasising cognition rather than the classical conceptualisation of learning with its emphasis on external observable behaviour. Both look back at Platonism as it is by the mind's 'knowing of forms' that the learner makes sense of the world.

In so far as the innatist element in cognitivism comes from Plato's theory of forms Platonism is in a part of all the modern cognitive theories of learning. These theories argue that knowledge becomes possible principally through reason. This may not necessarily require sensory experience. Such a position has been a continuing influence upon the field of learning and cognition incorporated in the epistemological tenet underlying later day constructivism as well.

Though separated by several centuries the underlying thought pattern in Plato and Immanuel Kant (1724–1804) is somewhat similar. Rationality is the essential aspect of human nature to both. So is rationalistic endeavour as the ideal epistemic enterprise (Navneet, Rekha; 2009). Like the former, Kant too advocated a strong dualism.

He was also interested in the issue of origin of knowledge. He propounded that there were innate categories of knowledge which were fixed, permanent and apriori. These include space, time, classes, causality and relations. He builds these various constructs (schema) into the human mind. Kantian schemas are a kind of structuralism. They represent a conceptual frame that the mind imposes on experience. With the ascent of constructivism as an intellectual position in educational theory such substance dualisms are not necessarily tenable as concepts and constructs are seen as cultural products as well.

Psychologist and educator Jean Piaget (1896–1980) was influenced by the Kantian notion of basic categories of knowledge but didn't agree that these were innate. According to him children came to understand concepts increasingly deeply through infancy, childhood and adolescence. The development of these concepts is basic intellectual acquisition. Like Plato he has accorded a significant place to mathematics in the comity of disciplines. He distinguishes between three types of knowledge—physical, logico-mathematical and social-arbitrary knowledge. Physical knowledge is located in the external world and can be constructed by the action upon objects and observation of their reactions. Akin to Plato, he argues that logico-mathematical knowledge has a different nature. It is not located in the external world. Also it is abstract in nature and cannot become known by any kind of observation in the real world. It develops as a result of reflective mental actions on objects (DeVries, 2000, pp. 203). While the origin of physical knowledge is in the processes of empirical abstraction, logico-mathematical knowledge develops by reflective abstraction. It is only through association with other mathematicians that mathematical knowledge can be acquired (Kamii, 1982). A common example that is given to explain the nature of logico-mathematical knowledge is that of number. Number is not a property of any group of objects but is a system of relationships created by the knower. Its source is the constructive process of the knower (DeVries, 2000; Kamii and DeVries, 1993).

Classical learning theory with its focus on external observable behaviour (Watson, 1919, 1924; Skinner, 1954, 1974) admits no 'forms'. There is no thought or reason in it either. Perusal of the mind by thought of forms (or mental ideas) is not considered as an explanation of learning. Internal mental activity is not supposed to be taking place as there is no place such as the mind in classical behaviourism, where it could possibly occur.

Plato's pedagogy

Plato's epistemology also informs his preferred pedagogy. Dialectics is the method by which learning occurred. It involves seeking the truth of the forms by discussion. Since the forms constitute any field of knowledge, and they are abstract, and can be known through thought/reason; then a lecture or even a demonstration could not lead to their discovery. It is the dialectical method of teaching in which the knower postulates general hypothesis/principles, and then examines them by looking for evidences in it's favour and disfavour. It involves dialogue between the knower and the seeker. During this dialogue there is a search for counter examples and illustrations, or even unacceptable logical consequences. It teaches the knower how to incline favourably to well reasoned arguments and unfavourably to bad ones (Ackrill, 2001). Plato's pedagogy of dialectical inquiry equips the learners with analytical tools-logic and reasoning with which to examine ideas and worldviews.

Perspectives in learning and cognition from history of epistemology

Behaviourism became a dominant position in educational psychology especially learning theory beginning from early twentieth century under the influence of psychologists like Watson (1924), Hull (1951) and Skinner (1974). Embracing empiricist epistemology it studies overt phenomenon that can be quantitatively observed, measured and analysed; rather than inner psychological functions or mental phenomenon. It seeks to formulate lawlike generalisations about these phenomenon in a typically positivist fashion. Regarding man as a responding entity whose acts can be described as causal chains (Nodding, 1997) somewhat similar to a machine, whose internal mental life if any is largely irrelevant to learning. It dismisses the idea of mind, thought or cognition. It rejects the autonomous existence of the knower organism who is no more than a unique byproduct of environmental reinforcement contingencies. Intellectual activity or thought is not required on part of the knower subject in order to acquire knowledge. It examines the observable behaviour of human organisms in response to stimuli and formulates the principles and laws governing the two. It is wholly non Platonism. Contrastingly Plato's doctrine of forms can be considered as a basis of cognitivism in learning theory as it roots knowledge primarily in the knower's cognition. Central to cognitivism is the notion of 'thought'

which is regarded as symbolic and internal to the individual as it is situated in the mind. It does not as such dismiss the ontological reality as expressed in the objective world but regards it as a basis for representations. Thought and mind's symbolic activities are taking place in and consist of these representations. Representationalism is regarded as among the essential features of cognitivism (Winch and Gingell, 1999). Knowledge becomes possible because objective reality is represented in the mind by the knower. So it is in the individual intellect, reason or mind; that the origin and source of knowledge is located.

The appeal of cognitivism as a psychology of education has ascended among educators in the last few decades because it betroths Rousseauian progressivism with the values of modern science (Winch and Gingell, 1999). Rousseau founded the doctrine of inherent educability of children in his time. This was in violation of the then prevailing conception about child nature being a byproduct of original sin and continuously needing correction through education. The ideal of child permissiveness meant that the child was to be permitted to be on his own. Endowed with human reason he could be trusted to discover knowledge by his own solitary exploration of the world. Not only was the knower child capable of coming to know like a solitary scientist rather than that was how learning and cognition best occurred. The outlook of modern science accentuates the Platonic view of the essence of man being this reason. It is through reason and rationality that man has not only uncovered truth and knowledge but made unprecedented strides in it.

The perspectives of behaviourism and cognitivism being founded on contrasting epistemologies described in this paper are generally considered as two orthogonal accounts of how knowledge, learning and cognition occur. They make alternative assumptions about the nature of the knower, the nature of knowledge and the process of knowing. In the former the knower is an animate machine who is manipulated by the environmental inputs and outputs almost like a puppet by the strings. The process of learning is one of the external operation and control upon the passive knower. The latter bestows intrinsic capacity for intellectual activity upon him. Learning consists of symbolic representation in the knower's active mind.

In the words of Botterill and Carrothers (1999, pp.50), "One of the major insights of cognitive science has been the extent to which we depend upon a natural cognitive endowment which assigns processing tasks to modular structures with quite specific and restricted domains and inputs."

Though influential in history of epistemology Aristotle's views have not been discussed in this paper. Well known British empiricists John Locke and David Hume who hold epistemologies different from Aristotle's have also not been discussed. These thinkers articulate a position that is complementary or rather contrasting to Platonism. This can present another perspective on learning theory from history of epistemology. Also the relatively recent constructivist and social constructivist views of learning have not been discussed. All of these merit a full discussion which is beyond the scope of the present paper.

At the end of the course my students were asking for the myriad of theories studied — Thorndike's trial and error, Pavlov's classical conditioning, Skinner's operant conditioning, Hull's systematic behaviour, Tolman's sign learning, Newell and Simon's general problem solver, Atkinson's memory model et al. In which camp does a theory fall ? Plato or not Plato? Where all is he in the given theory?

Platonism provides a valuable underpinning to the modern field of learning and cognition.

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