Constructivism: Pre-historical to Post-modern

William R. Warrick

George Mason University

Constructivism

Constructivism - whether as a mode of instruction or a school of thought on how the world is known by the observer - has a long and diverse history. While it has existed in some form for centuries, it has been known by a variety of names, practiced under a variety of guises and 'shapes' (Oxford 1997), and employed as an educational tool in numerous different ways. The purpose of this paper is to trace the history of constructivism - from its pre-history to the present, illuminate the myriad varieties of constructivist thought espoused by a number of highly regarded cognitive and social psychologists and educators, and to attempt to peer into the future to discover the possible manifestations of a constructivist approach to teaching in a world increasingly linked via telecommunication.

Constructivism refers to, "the philosophical belief that people construct their own understanding of reality" (Oxford 1997). Rather than assimilate a body of knowledge about one's world and environment, constructivists believe we 'construct' meaning based upon our interactions with our surroundings. These interactions provide the evidence and the opportunities for experimentation with the world and thus, construct our realities. In its most radical form, constructivists believe that there is no reality save for what we create with our own minds. Thus, there is some paradox in proposing a definition of constructivism in that its central

tenet is that there is no external truth or knowledge outside of a knower's experience. Indeed, von Glasersfeld (1989), a radical constructivist, writes, "To claim that one's theory of knowing is *true*, in the traditional sense of an experiencer-independent world, would be perjury for a *radical* constructivist" (p. 1).

It is suggested by von Glasersfeld that constructivism can only be understood though considering both ontology and epistemology. Ontology refers to issues concerning the nature of being and seeks to answer the questions, What is being? What is the nature of reality? Is there a reality? (Oxford 1997) Idealism, a branch of ontology, views reality as something that can only exist in ideas or ideals. The Idealists' assertion is that no claims about external realities can be made because they are observer-dependent and not absolute. Plato, an idealist, stated that perfect, unchanging, universal ideas compose reality but that the visible, external world of objects is just a shadow of these ideas (Oxford 1997). This contrasts with the realist notion that the true or real nature of things in the world is knowable in and of itself and independent of the knower.

Epistemology, the second philosophical root of constructivism, pertains to the origin, foundation, limits, and validity of knowledge. Central questions of epistemology include: "What is knowledge?", "Where does knowledge come from?", "How much does the knower contribute to the knowing process?". Epistemology deals with the transmission of knowledge (Ozmon and

Craver 1999).

With the roots of constructivism thus defined, we can examine its manifestations throughout history. Manus (1996) draws a comparison between Sophists and Socratics and thereby gives a glimpse into the pre-history of constructivist versus proceduralist approaches to knowledge acquisition. Sophists, traveling teachers, believed that knowledge could be transmitted via lecture and modeling. They believed that knowledge resided outside the person and could be acquired and used to further one's position within the "polis" (Manus 1996). Socratics, followers of Socrates, believed that learning was an inner experience and that why we learned was more important that what was learned.

Giambattista Vico published a treatise on the construction of knowledge in 1710. This treatise illuminated (rather than invented) the idea that knowledge is something that is constructed by the knower. Vico's concepts deal mostly with the relationship between truth, knowledge and the origins of language and the desire of the human mind to create knowledge (Lo 1996). It is through Vico's writings that we take the term 'constructivist'. His slogan, according to von Glasersfeld, was, "The human mind can only know what the human mind has made"(1989, p. 3).

While Vico is credited with coining the term 'constructivist,' Piaget is seen as the original

constructivist. His theory of knowledge, published in 1954, portrayed the child as a 'lone scientist' creating his or her own sense of the world (Oxford 1997). Piaget felt that biological development occurs through organization and adaptation to the environment, and the same occurs for cognitive development. While Piaget knew that this occurred within a social context, he maintained his focus on the individual learner.

Vico and Piaget, while not known in their time as constructivists initiated study into the theories of knowing and creating realities. The study of their work has given rise to a number of different varieties of constructivism. The realm of constructivism can be divided and sub-divided into a number of related categories of the main principles. Radical constructivism, whole theme constructivism, social-cognitive constructivism, idea-based social constructivism - all stem from the original concepts of constructivist theories, yet differ in the approach to defining how the knower constructs his or her knowledge. A primary division of the constructivist theory comes between the view of the knower as an individual - interacting within social structures, but creating his or her own view of reality independent of others, and the knower gaining his or her view of reality through a socially-mediated process. Where the earliest proponents of constructivism concerned themselves with the individual, later philosophers saw knowledge construction as part of, and arising from, social interactions. Dewey and, later, Vygotsky, recognized that the

construction of knowledge was rooted in a group context (Oxford 1997).

In light of the theories of constructivism and knowledge acquisition through interactions with nature, it is interesting to note that our interactions today are increasingly mediated by communication technologies. Clearly, no-one could foresee the advent of the Internet, or the degree to which it is becoming the 'world' with which we interact. Questions arise when considering this tool in a constructivist light: How will interaction with a disembodied social context affect knowledge acquisition? If we accept Vygotsky's notion that knowledge is constructed primarily through social interactions, can those interactions be replicated through electronic means?

Constructivism today has become a 'buzz word' - often mistaken by educators as an *approach* to teaching and learning, rather than a philosophy on how knowledge is created or obtained. Obviously, this has a great impact on the teaching and learning process. As we shall see later, constructivism has been adopted as a learning and teaching philosophy insofar as its central themes deal with the concept of how students know and learn.

As a way of knowing, constructivism should probably be contrasted with other philosophies which deal with the nature of knowledge and reality. Starkly contrasting with constructivism is realism. Realism holds that real or true things in the world are recognizable.

That there is a truth that can be known and imparted to others through a variety of means. Realists believe that there is an 'external' world, independent of subjectivity. Humans can be made aware of the attributes of objects and have access to them.

Idealism is closely related to constructivism. Idealists assert that, "reality exists only in ideas or ideals and that we cannot make firm claims about any so-called external reality (Oxford 1997). Idealism, "proposes a painstaking and ingenious model that reason constructs of itself and it reduces the view of the universe entirely to ideas" (von Glasersfeld 1995). As a philosophy of knowing, then, idealism contends that the world consists of ideas. Constructivists believe that anything that is known must be created in the mind of the knower.

Another idea related to knowledge and learning is objectivism. Objectivist theory of knowledge is based on a dualism between knower and known; knowledge exists independently of the knower, and understanding is coming to know that which already exists (Biggs 1996). Once again, the contrast between this theory of knowing and constructivism is clear. The dualism is rejected by the constructivist in favor of the idea that there is no 'known' that can be external to the knower.

Much of the interest in constructivism today relates to its application in the teaching and learning practices. As stated earlier, constructivism is first and foremost a philosophy of

knowing. As such, it has been 'adopted' by educators as a way of thinking about teaching and learning. Viewed as an educational theory, constructivism can be compared with other educational philosophies. One such philosophy is proceduralism which, according to Manus, "dominates our schools" (1996). Procedural methodologies have given rise to performance criteria, behavioral objectives, and competency-based testing (Manus 1996). Proceduralism is performance driven and teacher directed. Direct instruction, highly structured and sequenced is a result of the proceduralist approach to teaching. The focus of the two modes of instruction are at odds with one another. While proceduralism focuses on task completion, constructivist teaching concentrates on the student.

Discussing the major contributors to the philosophy of constructivism is difficult in that the majority of them have been declared 'constructivists' posthumously. While the term constructivist has only recently come into vogue, many theorists who wrote on the nature of knowledge and learning embraced the tenets of constructivism.

Von Glasersfeld credits Giambattista Vico with first defining a way of knowing and learning as constructivist (Gruender 1996). Vico, an 18th century philosopher and scientist, was an admirer of the work of René Descartes. He was born in Naples, the son of a bookseller, in 1668. While occupying the Chair of Rhetoric at the University of Naples, Vico was required to

deliver an annual inaugural oration - six were given between 1699 and 1706. The seventh, entitled *On method in contemporary fields of study,* is an investigation into the merits of different educational methods, to be achieved by assessing the advantages and disadvantages of those of the classical and modern worlds (Pompa 1982). In this work, Vico investigated the methods of knowledge acquisition and the nature of knowledge itself. In a later work, *On the ancient wisdom of the Italians taken from the origins of the Latin language,*(1710) Vico took as his thesis the identity of the true with what is made or done (Pompa 1982). In the first section, Vico begins by pointing out that Latin words *verum* (the true) and *factum* (what is made) are interchangeable. From this, and other comparisons, Vico determines that the ancient philosophies of the Italians held the following beliefs about the true:

> that the true is what is made; that the first truth is therefore in God, because God is the first Maker; that the first truth is infinite, because God is the Maker of all things; and that it is complete, because it makes manifest to God since He contains them, the elements of things, extrinsic and intrinsic, because he both contains and arranges them, whereas the human mind, because it is finite and external to everything other than itself, collects only the outermost elements of things, rather than all of them. Consequently, while it can, indeed, think about things, it cannot understand them. It therefore participates in reason, but lacks mastery of it. (Vico, 1710)

Thus, Vico believed that the human reason can only know what the human mind has made (von Glasersfeld 1989). Because of this philosophy, Vico is credited with being the original

constructivist. Believing that there is nothing that is true or real other than what the experiencer creates within the mind.

American philosopher and educator, John Dewey is often classified as constructivist. His beliefs about education and ways of knowing included the premise that knowing is not done by an outside spectator but is instead constructed by a participant, with society providing a reference point or theory for making sense of the experience (Oxford 1997). Dewey expanded on the notion that all knowledge is constructed by the knower by including the idea that there is a relationship between the individual, the community, and the world mediated by socially constructed ideas (Oxford 1997). This brand of constructivism is sometimes referred to as social constructivism. Unlike those philosophers before them, social constructivists believe that knowledge construction takes place, and is enhanced, by social interaction.

Another proponent of the constructivist ideology, though, like Vico, prior to the establishment of a constructivist philosophy, was Jean Piaget. Piaget was unquestionably the pioneer of the constructivist approach to cognition in this century (von Glasersfeld 1995) Throughout his life, Piaget worked on creating a theory of cognition and develop an approach to epistemology. Because of his work with children, in studying the development of their knowledge, much of Piaget's work has been categorized, mistakenly, according to von

Glasersfeld, as child psychology rather than philosophy. Von Glasersfeld writes that there is vast literature, "on Piaget's theory of cognitive development that largely disregards his epistemological presumptions and consequently misinterprets the experiments as tests of performance rather than of conceptual operating" (1995).

Piaget's early work, *La construction du réel chez l'enfant* (1937) was an attempt to show that human infants can construct for themselves the reality they experience (von Glasersfeld 1995). Piaget sought the foundations of knowledge with an explicitly biological foundation (Lewin 1987).

Piaget saw viewed himself as a constructivist. In discussing three tendencies of psychological research he writes,

> The third tendency , which is decidedly my own, is of a constructivist nature. It recognizes neither external performations (empiricism) nor immanent performations (innateness), but rather affirms a continuous surpassing of successive stages. This obviously leads to placing all educational stress on the spontaneous aspects of the child's activity (Piaget 1973).

The application of Piaget's work to educational practice has focused on the activities of the learner. As he wrote in To Understand is to Invent, "to understand is to discover, or reconstruct by rediscovery (Piaget 1973). Piaget advocated a system which matched the curriculum to the student's level of development. He believed that human beings develop

increasingly more complex levels of thinking in definite stages. Each stage being characterized by the possession of certain *schemas* (Joyce and Weil 1996). Piaget believed that "teaching is the creation of environments in which students cognitive structures can emerge and change" (Joyce and Weil 1996).

Another major contributor to the field of constructivism is Lev Vygotsky. In the introduction to Mind in Society, Cole writes, "Vygotsky was a lawyer and philologist in Russia. He began his career as a psychologist following the Russian Revolution 1917" (Vygotsky 1978). A prolific writer in Russia, his works were suppressed and are only recently becoming available for translation and distribution.

Von Glasersfeld calls Vygotsky the "founding father of Social Constructivism" (von Glasersfeld 1995). Vygotsky perceived that thought evolved from both the experiences and maturation process of an individual (Manus 1996). Significantly, he also believed that constructs have social origins and that they are learned through interaction with others (Oxford 1997). Vygotsky's views diverge from Piaget's in this respect. While both would agree that learning occurs in the activities and experiences of the learner, Vygotsky places emphasis on the interaction with social groups. Manus writes, "[Vygotsky perceives] an individual's consciousness evolved from mediated activities that would then be internalized into higher forms

of cognitive functions (1996). Vygotsky put much of his efforts into studying the relationship of speech and communication with learning in a social context. In *Mind and Society*, he writes, "children solve practical tasks with the help of their speech, as well as their eyes and hands" (Vygotsky 1978).

Like Piaget, Vygotsky matched learning with developmental levels. Yet, he took the idea further in defining what he called the zone of proximal development. In Mind in Society he writes,

> the zone of proximal development is the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers (Vygotsky 1978)

Vygotsky's work in social-cognitive constructivism is beginning to have a profound effect on the design of learning situations and communities.

Catherine Fosnot, in her introduction to *The Case for Constructivist Classrooms*, states, "Constructivism is not a theory about teaching. It's a theory about knowledge and learning" (Brooks and Brooks 1999). In discussing the impact of constructivism on education it should be repeated that, while proponents of the constructivist philosophy see a wide range of educational applications, constructivism is a theory or philosophy about knowing and gaining knowledge and

not a teaching practice in and of itself. To look to constructivism for teaching methodologies is every bit as misguided as looking to Catholicism or Republicanism for teaching practices. Constructivism, like its religious and political counterparts, is a philosophy - a theory about the world. Each can be invoked in designing learning experiences but none provide a plan for teaching.

While it would be an easy task to look back in history to show teachers and methodologies which closely resemble that which we view today as constructivism, it is probably more pertinent and to the point of this paper to contain our exploration of the impact constructivism has had on today's educational practices. As we have seen, numerous philosophers throughout history have been shown, in hindsight, to be constructivist in their outlook. Today, we must look at the impact constructivism as a philosophy of knowing has on teaching and learning.

Returning to Vico's slogan, "the human mind can know only what the human mind has made", we can easily see why this view of knowledge acquisition could have a great impact on the way we see children learn. If we give up the notion that knowledge is external to the mind, then we begin to see that children can only know what they, in their minds, have made for themselves. There can be no doubt that to say that there is no knowledge outside the mind of the

observer (student) has a huge impact on the time honored paradigm of teacher as a 'dispenser of knowledge'. The basis of our education system is that there is an inert body of knowledge that must be imparted to the students. In general, teachers disseminate knowledge and expect students to identify and replicate the fields of knowledge disseminated (Brooks and Brooks 1999). More to the point, schooling is premised on the notion that there exists a fixed world that the learner must come to know (Brooks and Brooks 1999). This suggests a belief that there are truths that are independent of the knower - discrete facts which must be committed to memory to satisfy our educational aims. The success of this methodology, sometimes described as "scientific", "behavioristic", and "positivistic" (Gruender 1996), is measured using standardized tests.

A constructivist philosophy would clearly reject the idea that there is an external body of knowledge that the student must adopt and know. The radical constructivist would argue that there is no reality other than what the student creates.

Teachers who follow constructivism would believe that the information and knowledge that the child gains from schooling must come from the experiences that the child has. Rather than have the teacher give the students facts and concepts concerning a particular topic and expect the student to memorize or in some way internalize that information, teachers would be

more likely to provide the student with learning experiences designed to allow the student to discover the desired information. Whether or not the discoveries made by the student are those which are desired by the teacher or curriculum, or those that are most meaningful to the child, is at the discretion of the teacher. Maintaining a constructivist belief in cognitive development does not, as some would argue, preclude the assimilation of information as might be found in an adopted curriculum guide or Standards of Learning. Rather, the information gained in the context of experiences and social interactions are more meaningful and relevant to the student. Brooks and Brooks offer a comparison of 'traditional' paradigms and constructivist classrooms. In traditional classrooms, students are trained to repeat specific procedures and chunks of information. When they are able to do this, they are said to have 'learned'. This is generally measured or assessed through multiple-choice or short-answer tests. In the constructivist classroom, deep understanding rather than imitative behavior, is the goal (Brooks and Brooks 1999). Further, they state that,

> educational setting that encourage the active construction of meaning have several characteristics:
>
> - They free students from the dreariness of fact-driven curriculums and allow them to focus on large ideas.
> - They place in students' hands the exhilarating power to follow trails of interest, to make connections, to reformulate ideas, and to reach unique conclusions.

- They share with students the important message that the world is a complex place in which multiple perspectives exist and truth is often a matter of interpretation.
- They acknowledge that learning, and the process of assessing learning, are at best, elusive and messy endeavors that are not easily managed (Brooks and Brooks 1999).

The potential for reforming the classrooms of tomorrow to reflect constructivist attitudes and theories is enormous. Using the constructivist philosophy of knowledge acquisition and learning in social contexts can significantly change the way schools are organized.

The work of Vygotsky, indeed of all theorists and philosophers before him, is beginning to produce a profound effect on the way in which we view knowledge and learning. Perhaps because if its close ties with the mind and with education, constructivism's effect should be most deeply felt in the structure of schools and, in particular, learning environments. With the advent of improved communication tools, those who espouse social constructivism and its import to the learning and knowing process, will see an impact in the areas of computer mediated communication and teaching. Nearly 300 years since Giambattista Vico wrote his treatise first defining constructivist theories, we are still seeing new vistas for learning and teaching open before us.

References

Biggs, J. (1996). "Enhancing teaching through constructive alignment." Higher Education 32(3): 347-364.

Brooks, J. G. and M. G. Brooks (1999). In Search of Understanding: The Case for Constructivist Classrooms. Alexandria, Association for Supervision and Curriculum Development.

Gruender, D. C. (1996). "Constructivism and Learning: A Philosophical Appraisal." Educational Technology 36(3): 21-29.

Joyce, B. and M. Weil (1996). Models of Teaching. Boston, Allyn & Bacon.

Lewin, P. (1987). Constructivism and the Epistemic Object. Annual Symposium of the Jean Piaget Society, Philadelphia, PA, Educational Resources Information Center.

Lo, H. N. (1996). Giambattista Vico, Georgia Institute of Technology. 2001.

Manus, A. L. (1996). "Procedural versus Constructivist Education: A Lesson from History." The Educational Forum 60(4): 312-16.

Oxford, R. (1997). "Constructivism: Shape-Shifting, Substance, and Teacher Education." Peabody Journal of Education 72(1): 35-66.

Ozmon, H. A. and S. M. Craver (1999). Philosophical foundations of education. Upper

Saddle River, NJ, Merrill/Prentice Hall.

Piaget, J. (1973). To Understand is to Invent: The Future of Education. New York, Grossman Publishers.

Pompa, L., Ed. (1982). Vico: Selected Writings. Binghamton, N. Y., Press Syndicate of the University of Cambridge.

von Glasersfeld, E. (1989). An Exposition of Constructivism: Why Some Like It Radical, Massachusetts Univ., Amherst. Scientific Reasoning Research Inst.: 14.

von Glasersfeld, E. (1995). Radical Constructivism: A Way of Knowing and Learning, The Falmer Press.

Vygotsky, L. S. (1978). Mind in Society: The Development of Higher Psychological Processes. Cambridge, MA, Harvard University Press.