“Constructivism: Implications for the Design and Delivery of Instruction”
Duffy and Cunningham

Should students construct their own knowledge? If their learning experiences are meaningful, then students are more engaged in the learning process. Constructivism has a wide diversity of views. “Learning is an active process of constructing rather than acquiring knowledge. Instruction is a process of supporting that construction rather than communicating knowledge.” (171). Duffy and Cunningham examine the processes by which knowledge, learning and construction are supporting in student learning.

Constructivism leads inevitably to subjectivism, as students actively try to construct meaning to their learning. The value or truth can not be judged with any degree of certainty, because there is a contradiction between views. These contradictions are an element of constructivism, as different perspectives are necessary to help students seek their own truths. Students can probe at deeper and deeper levels to determine where or if our understandings begin to diverge, although there must be some common meaning. Constructivism must understand and challenge the learner’s thinking.

In the early 18th century, Giambattista Vico was the first to be credited with constructivist theory. He was quoted as saying “to know means to know how to make.’ 20th century philosophers such as Kuhn, Wittgenstein, and Rorty are frequently cited for their basic argument that knowledge is a construction by individuals and is relative to the “community.” The community refers to the fact that knowledge is socially determined, and that an accepted group must agree with your assertion before it is counted as knowledgeable.

Kuhn’s *Structure of Scientific Revolution* looks at theories of science and how paradigm shifts look for the best description view of theory rather than an approximation
to the truth. All facts are theory laden, according to Kuhn. Wittgenstein took a similar position in his study of language, and how meanings have different interpretations. Richard Rorty a pragmatic theorist holds that “knowledge is not a matter of getting it right but rather acquiring habits of action for coping with reality.” Can we seek the truth or can we at least find some understanding?

Rorty argues that viability – our perception of the world, as we understand it is culturally determined. Knowledge and understanding are ethnocentric and viability is established through obtaining unforced agreement with the community. We can change our self-image from one of finding to one of making. Knowledge is a constructive process rather than a finding.

Following Vico in the middle 18th century was Rousseau who emphasized learning by doing. The teachers’ role is that of presenting problems that would stimulate curiosity and promote learning. John Dewey was perhaps the greatest proponent of situated leaning and learning by doing. He rejected the traditional educational framework of memorization and recitation and argued that “education is no preparation for life, it is life itself.”

Dewey knew that education must meet the changing needs of society. Society has certainly changed since Dewey’s time so we must consider the necessary changes that teachers must take in constructivist theory. The teacher plays a central role in constructivist theory. Discovery learning focuses on the process of discovery in the learner, as the learner seeks understanding of some issue, but in discovery learning the teacher knows the answer and student are to discover it. Learning to learn by asking question and evaluate one’s own strategies stimulates learning. The purpose of learning is for an individual to construct his or her own meaning, not just memorize the "right"
answers and regurgitate someone else's meaning. Constructivism goes beyond discovery.

Social interaction in the classroom is essential to the constructive process of learning. When students are involved in the construction of their understanding, social interaction is taking place. Students are involved in collaborative learning. They share alternative viewpoints and challenge as well as help develop alternative points of view.

Some teachers express concern that there is a neglect of traditional skills in constructivist learning. An inquiry-based approach to instruction can be challenging too many educators, who are concerned that basic content may be omitted from the curriculum. Teachers serve as a manager or coach in a constructivist classroom. Ownership of the learning activity belongs to the student as he or she tries to make sense of the world, which will make it more meaningful to them. Constructivism focuses on the diversity of individual cognitive and sociocultural differences. Students must be able to complete the parts of the puzzle, which is referred to as “puzzlement.”

The authors examine notions of the *metaphors of the mind*. First we have the “mind as computer” (MAC). The mind works by processing symbols according to rules. Meaning is mapped onto these symbols via our experiences in the world. Learning is a process of information acquisition processing according to innate or acquired rules, and storage for future use. Instructional design and development is a premise of the mind as computer. Next we have the “mind as brain” (MAB) which is more of a cognitive thought. Symbols are learned consequences of particular experience or interactions in the world, which are then mapped on or distributed across neural-like networks.

MAC and MAB model are alike in that both characterize mind as separate from the environment and as information processing bound within individuals. Knowledge is a matter of storage and retrieval according to rules in the MAC view, but a function of
distributed connection strengths and network activation for the MAB position. The
difference sets the stage for the possibility of some fresh thinking about the teaching
learning process. The last metaphor is that of “mind as rhizome” (MAR). The MAR is a
metaphor, which suggests nonlinearly thinking in which everything is connected.
According to the MAR metaphor we are connected to other people individually but also
collectively. Constructivism is in line with the MAR metaphor. We have our individual
worldview, which defines our culture. We all have our own realities of the real world

Tools and signs mediate learning on a social and individual level. Technology is a
teaching tool that students can use to create models of understanding. Webquest
incorporate constructivist ideas. The word processor has helped us to more efficient in
our writing. The computer is an example of “mediational” means that has aspects of both
tool and sign. Instances of learning are constructions situated within a context that
employs some form of mediational means tools, and/or signs. Hypermedia can be an
application of inquiry, and a tool for problem solving. Hypertext supports non-linear
thinking. The mediation of language and signs is that knowledge and thereby learning,
becomes a social communicative and discursive process.

Instructional design and instructional methods require understanding of the
mental models that students use to perceive the world and the assumptions they make to
support those models. Under the theory of constructivism, educators focus on making
connections between facts and fostering new understanding in students. It is important
that students develop a conceptual understanding in their learning. Instructors tailor their
teaching strategies to student responses and encourage students to analyze, interpret, and
predict information. Teachers also rely heavily on open-ended questions and promote
extensive dialogue among students. “Scaffolding” is the support for learning, which is
the structure of the learning environment. The constructivist view of context includes the individual and the sociohistorical context. Learner control is a concept related to computer-based instruction. The issues of what control are best for students are in debate. Assessment is another issue of constructivism. Assessment becomes part of the learning process so students play a larger role in judging his or her own progress. Peer and self-assessment are methods of assessing the constructivist learning. Performance assessment, portfolios, and authentic assessment are means to assess constructivist learning. Reliability and validity are in question when alternate means of assessment are used.

Problem based learning is the final component of constructivism the authors examine. Strategies for instructional should support Curriculum should be organized in a spiral manner so that the student continually builds upon what they have already learned. Students should be engaged and supported in their activities. Self-directed learning affords students to seek and use resources that will address the issues they need to learn about.

Each of us generates our own "rules" and "mental models," which we use to make sense of our experiences. Learning, therefore, is simply the process of adjusting our mental models to accommodate new experiences. Educators must be prepared for the design and delivery of instruction based on constructivist theory.