Constructivism and Learning – Two Perspectives

1. Excerpts from: Donald G. Hackmann. 2004. "Constructivism and Block Scheduling. Making the Connection." *Phi Delta Kappan*: 697-702, May.

In the past few decades, a growing body of research on cognitive processing has made inroads into classroom practices. Whereas behaviorism primarily focuses on the teacher's role as transmitter of knowledge, a different view of learning has emerged – constructivism – that emphasizes the student's role in the learning process. Building upon the work of Jean Piaget, Lev Vygotsky, and others, constructivist theory is based on the premise that individuals must be socially engaged in learning – actively creating knowledge from existing knowledge from their existing knowledge base, beliefs, and personal experiences. Constructivists advocate learners' participation in context-bound, real-world problem solving and call upon students to engage in meta-cognition....

In contrast to the well-developed teaching models based on behaviorism, constructivism is an emerging theory that is currently descriptive, not prescriptive, in nature. To promote greater comprehension and mastery of content, constructivists emphasize depth of understanding rather than a superficial treatment of subject matter. Educators are encouraged to refashion their roles to become learning facilitators acting as a "guide on the side" instead of a "sage on the stage."...

When describing the shift from teaching to learning, educators sometimes revert to catch phrases – such as "hands-on learning," "active engagement of the learner," and "depth over breadth" --- without explaining how these concepts can be applied in the classroom and without attributing them to constructivism. For example, two principles of the Coalition of Essential Schools – "less is more" and "student as worker" – promote constructivist beliefs, and the National Association of Secondary School Principals recommends that teachers act "as coaches and as facilitators of learning to promote more active involvement of students in their own learning."...

Some writers warn that constructivists are overzealous in promoting learner-centered practices are overzealous in promoting learner-centered practices, arguing that behaviorists' models are necessary in certain instructional situations and that hands-on approaches are not easily developed in every discipline. The key is to strike an appropriate balance so that teacher-directed and student-centered learning activities complement one another....

Constructivism has been described as "a culture – a set of beliefs, norms, and practices"... In such a culture, teachers purposefully select strategies during lesson preparation, not because they are "hands-on" and use up time, but because they are designed to help students construct meaning from the curriculum. Instructional techniques – such as interdisciplinary teaming, curriculum integration, direct instruction, problem-based learning, cooperative learning, Socratic seminars, and inquiry learning – and assessment strategies are viewed collectively through a constructivist lens and are employed when they support learning....

2. "Constructivist Processes and Education" From William F. Brewer, on-line at **Education Encyclopedia**, Learning Theory: Constructivist Approaches.

There are a number of competing constructivist views in education. Constructivists tend to celebrate complexity and multiple perspectives, though they do share at least a few educational prescriptions.

Prior knowledge. Constructivists believe that prior knowledge impacts the learning process. In trying to solve novel problems, perceptual or conceptual similarities between existing knowledge and a new problem can remind people of what they already know. This is often one's first approach towards solving novel problems. Information not connected with a learner's prior experiences will be quickly forgotten. In short, the learner must actively construct new information into his or her existing mental framework for meaningful learning to occur.

For example, Rosalind Driver has found that children's understanding of a phenomenon (interpretations that fit their experiences and expectations) differ from scientific explanations. This means that students distinguish school science from their "real world" explanations. Studies of adult scientific thinking reveal that many adults hold non-normative scientific explanations, even though they have studied science. This is what the philosopher Alfred Whitehead (1861 - 1947) referred to as *inert knowledge.* Asking students what they already know about a topic and what puzzles them affords an opportunity to assess children's prior knowledge and the processes by which they will make sense of phenomena.

Real and authentic problems. Constructivist learning is based on the active participation of learners in problem-solving and critical thinking - given real and authentic problems.

In *anchored instruction,* for example, as advanced in the work of the Cognition and Technology Group at Vanderbilt University, learners are invited to engage in a fictitious problem occurring in a simulated real-world environment. Rich and realistic video contexts are provided - not only to provide relevant information for solving the problem, but also to create a realistic context. If the students buy in to the proposed problems, they will be engaged in problem solving similar to what the people in the video are engaged in.

There are also many examples of project-based learning in which students take on tasks such as building a vehicle that could cross Antarctica. It is unclear whether these constitute authentic problems - or what students learn from project-based learning.

Constructivist curriculum. A constructively oriented curriculum presents an emerging agenda based on what children know, what they are puzzled by, and the teachers' learning goals. Thus, an important part of a constructivist-oriented curriculum should be the negotiation of meaning. Maggie Lampert, a mathematics teacher, guides students to make sense of mathematics by comparing and resolving discrepancies between what they know and what seems to be implied by new experience.

In constructivist classrooms, curriculum is generally a process of digging deeper and deeper into big ideas, rather than presenting a breadth of coverage. For example, in the Fostering Communities of Learners project where students learn how to learn, in knowledge-building classrooms where students seek to create new knowledge, or in Howard Gardner's classrooms where the focus is on learning for deep understanding, students might study endangered species, island biogeography, or the principles of gravity over several months. As students pursue questions, they derive new and more complex questions to be investigated. Building useful knowledge structures requires effortful and purposeful activity over an extended period.

Cognitive conflict and social context. According to Dewey, "Reflection arises because of the appearance of incompatible factors within an empirical situation. Then opposed responses are provoked which cannot be taken simultaneously in overt action" (p.326). To say this in another way, cognitive conflict or puzzlement is the stimulus for learning, and it determines the organization and nature of what is being learned. Negotiation can also occur between individuals in a classroom. This process involves discussion and attentive listening, making sense of the points of views of others, and comparing personal meanings to the theories of peers. Justifying one position over another and selecting theories that are more viable leads to a better theory. Katerine Bielaczyc and Allan Collins have summarized educational research on learning communities in classrooms where the class goal is to learn together, to appreciate and capitalize on distributed expertise, and to articulate the kinds of cognitive processes needed for learning.

Constructivist assessment. Assessment of student learning is of two types: formative and summative. Formative assessment occurs during learning and provides feedback to the student. It includes evaluations of ongoing portfolios, and demonstrations of work in progress. Student collaboration also provides a form of formative assessment. In FCL, for example, students report to each other periodically on their research. In knowledge-building classrooms, students can read and comment on each other's work with the Knowledge Forum software. Formative assessment rarely occurs in classrooms.

Summative assessment occurs through tests and essays at the end of a unit of study. Summative assessments provide little specific feedback. From a constructivist perspective, formative assessments are more valuable to the learner, but with the recent emphasis in North America on standards, and due to the poor alignment of constructivist approaches and standards, it is very difficult to harmonize formative and summative assessments.

Technology and constructivism. Cognitive research has uncovered successful patterns in tutorial, mentoring, and group discussion interactions. However, typical Internet chat and bulletin-board systems do not support a constructivist approach to learning and instruction. During the 1990s, researchers created tools such as Knowledge Forum, the Knowledge Integration Environment, and Co Vis to more fully address constructivist principles. Each of these tools invites collaboration by structuring the kinds of contributions learners can make, supporting meaningful relationships among those contributions, and guiding students' inquiries. Teachers who use information and

communication technologies in their classrooms are more likely to have a constructivist perspective towards learning and instruction. Additionally, sophisticated information and technology communications tools can capture the cognitive processes learners engage in when solving problems. This affords teacher reflection and coaching to aid deeper learning. It also affords teachers the chance to learn from each other.

The teacher's role. The teacher's role in a constructivist classroom isn't so much to lecture at students but to act as an expert learner who can guide students into adopting cognitive strategies such as self testing, articulating understanding, asking probing questions, and reflection. The role of the teacher in constructivist classrooms is to organize information around big ideas that engage the students' interest, to assist students in developing new insights, and to connect them with their previous learning. The activities are student-centered, and students are encouraged to ask their own questions, carry out their own experiments, make their own analogies, and come to their own conclusions. Becoming a constructivist teacher may prove a difficult transformation, however, since most instructors have been prepared for teaching in the traditional, objectivist manner. It "requires a paradigm shift," as well as "the willing abandonment of familiar perspectives and practices and the adoption of new ones" (Brooks and Brooks, p. 25).

A constructivist approach to education is widely accepted by most researchers, though not by all. Carl Bereiter argues that constructivism in schools is usually reduced to project based learning, and John Anderson, Lynn Reder, and Herbert Simon claim that constructivism advocates very inefficient learning and assessment procedures. In any event, the reality is that constructivism is rarely practiced in schools.

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Cognitive Engagement (Article Excerpt)

An excerpt from: Tharp, R. G., P. Estrada, S. S. Dalton, and L. A. Yamauchi, 2000. **Teaching Transformed. Achieving Excellence, Fairness, Inclusion, and Harmony.** Boulder, Colorado: Westview Press, 30-31.

There is a clear consensus among researchers that all students, perhaps at-risk students especially, require instruction that is cognitively challenging; that is, that requires thinking and analysis, not only rote, repetitive, detail-level drills. This does not mean ignoring phonics rules, or not memorizing the multiplication tables, but it does mean going beyond that level of basic skills into the exploration of the deepest possible reaches of analysis and problem solving. When all students are expected to meet high academic standards and to devote serious effort to academic pursuits; when they learn how to engage in sustained, disciplined, critical thought on topics relevant beyond school; then there will be achievement gains for all students, including the disadvantaged (Lee, Smith, and Croninger 1995; Waxman, Padron, and Knight 1991).

Working with a cognitively challenging curriculum requires appropriate leveling of tasks, so that students are stretched to grow within their "zones of proximal development" (Vygotsky 1978), where they can reach higher performance with assistance from teachers and collaborating peers. Teaching complex thinking certainly does not mean drill-and-kill exercises; neither does it mean overwhelming challenges that discourage effort. Getting the correct balance involves striking the "productive tension" between support and challenge, between the pleasures of mastery and of moving beyond present accomplishments (Csikszentmihalyi, Rathunde, and Whalen 1993; Langer 1995; Applebee 1996). Designing activities that are more challenging will bring a marked advance in the excitement and gratification of the classroom day.

It is much easier to teach to routine, minimum standards, because challenging students toward cognitive growth requires that teachers challenge, assess, and assist themselves right along with the learners. The perceived cost of the effort to teachers in preparing cognitively challenging learning activities too often deters it. Yet this is the level of activity that can keep the profession (and individual teachers) vital. In addition, at-risk students, particularly those of limited standard English proficiency, are often "forgiven" any academic challenges on the assumption that they are of limited ability, or they are "forgiven" any genuine assessment of progress because the assessment devices don't fit. Thus, both standards and feedback are weakened, with the predictable result that achievement is handicapped. Although such policies may often be the result of benign motives, the effect is to deny many diverse students the basic requirements of progress: high academic standards and meaningful assessment that allows feedback and responsive assistance (Fradd and Larrinaga McGee 1994; Waxman, Padron, and Knight 1991).

Challenging and stimulating cognitive growth means encouraging students to review and question their own and others' beliefs and rationales. Activities for problem solving through dialogue provide an organizing structure for students to construct new understandings. Dramatic problems with real-life meaning can help students at any level to evaluate, revise, and reorganize their conceptual structures (Bruer 1993). The object of complex thinking is most often not to conclude with a correct answer, but to expand discussion and promote alternative solutions or perspectives (Langer 1995).