What Is Unique about Constructivism? (Assumptions)

The constructivist theme that runs through current research on teaching and learning supports active learning and engagement in authentic activities that take place in the social culture of practice. Learning is guided by teachers whose roles are to facilitate learning and coach learners to question assumptions and arrive at new meanings. The constructivist approach to teaching and learning may be seen in teaching practices that reflect—

- Connection with authentic pedagogy, defined by Newmann, Marks, and Gamoran (1995) as instructional activities and assessments that are “rooted in a primary concern for high standards of intellectual quality” (p. 1);
- Correlation with brain-based learning principles, described by Caine and Caine (1990) as teaching to reflect the way the brain operates; and
- Connotations for a new teaching paradigm that requires a shift from traditional instructional practices, curriculum, and assessments.

Advantages and disadvantages of constructivism as viewed from these perspectives and a summary of the implications for implementing constructivism in schools follow.

Connection with Authentic Pedagogy

Constructivism implies that learning should be individually constructed through active and connected learning, strategies that are consistent with those of authentic pedagogy. However, not all constructivist teaching and learning practices are authentic. The following four questions serve as guides to a discussion of the correlation between constructivism and authentic pedagogy as reflected in teaching and learning practices. The answers to the questions are excerpted from an article by Newmann et al. (1995, pp. 1-4).

1. Is High Quality Achievement the Goal of Learning?
Educators and reformers often worry that today's students spend too much of their time simply absorbing—and then reproducing—information transmitted to them. They fear that students aren’t learning how to make sense of what they are told and that there is little connection between activities in the classroom and the world beyond school. Students can earn credits, good grades and high test scores, they say, demonstrating a kind of mastery that frequently seems trivial, contrived or meaningless outside the school. The reformers call instead for “authentic” achievement, representing accomplishments that are significant, worthwhile, and meaningful.

To confront this problem, schools are adopting a wide variety of active-learning techniques. In many classrooms where lectures once prevailed, students now take part in small-group discussions and cooperative learning exercises. They conduct independent studies, or make greater use of computers, video recording systems, and other high-tech equipment. Their assignments take time out of the classroom to conduct community-based projects, such as oral histories, surveys, or service learning programs. Students exposed to such techniques often display greater enthusiasm and engagement. This heightened participation can lead some observers to conclude that higher-quality learning must be taking place.

But active learning alone offers no guarantee of high quality student achievement. If a small group’s task is to solve routine math problems, for example, and one student produces the answers for others to copy, little or no serious academic work is accomplished. Or, if students survey community residents by simply asking short-answer questions written by a teacher and recording the answers, without reflecting on them, the opportunity to construct deeper meaning is lost. Educators must ensure that new approaches to learning are aimed toward high intellectual standards. Otherwise students’ work, however “active,” can remain shallow and intellectually weak.

2. Do Learner Achievements Reflect Authentic Learning?

Consider the types of mastery demonstrated by successful adults, such as scientists, musicians, business entrepreneurs, novelists, nurses and designers. What key characteristics of their work justify calling their accomplishments authentic? And how do these achievements differ from the work that students complete in school? In answer to these questions, the following three criteria are offered:
Construction of Knowledge

The people mentioned face the challenge of constructing or producing meaning or knowledge, instead of merely reproducing meaning or knowledge created by others. Depending on their particular field, they may express this knowledge in different ways. For example, they may use words or symbols to write or speak about their findings. Or they might make things, such as furniture or a movie, or take part in performances for audiences, such as dance recitals or athletic contests.

Students taught within a conventional curriculum, on the other hand, are usually asked merely to identify the work that others have produced. They may be drilled on the differences between nouns and verbs, for example, or called upon to match authors with their works.

Disciplined Inquiry

For achievement to be authentic, it must be grounded in a field of knowledge, which usually includes facts, a specific vocabulary and a set of concepts and theories. Authentic performance in that field reflects an in-depth understanding of a particular problem or issue. That understanding is expressed through elaborate forms of communication that make use of written, visual and/or symbolic language to express ideas, nuances and details.

The conventional school curriculum, on the other hand, is more likely to require students to memorize isolated facts about a wide array of topics, and then use those facts to complete short-answer tests, which don’t require deep understanding or elaborate communication.

Value beyond School

Authentic achievement has aesthetic, utilitarian, or personal value beyond merely documenting the competence of the learner. Successful adults engage in a wide variety of activities aimed at influencing an audience, producing a product or communicating ideas, from writing letters to developing blueprints to speaking a foreign language. Achievements of this sort have special value that is missing from tasks, such as spelling quizzes or typical final exams, which are contrived only for the purpose of assessing knowledge. The oft-heard cry for “relevant” or “student-centered” curriculum, is, in many cases, a less-precise expression of this desire that student ac-
complishments should have value beyond measuring success in school.

According to our conception, the most authentic achievements must meet all three of these criteria. Students might, for example, tackle a calculus problem that requires construction of knowledge and disciplined inquiry; but, if the solution has no value except to prove that the students can solve calculus equations, its authenticity is diminished. Likewise, a student who writes a letter to the local newspaper editor commenting on welfare reform may be constructing knowledge to produce discourse with value beyond school. But if the student's analysis is shallow or based on significant errors, it doesn't qualify as disciplined inquiry.

Although our concept of authentic academic achievement demands that all three of these standards be met, this doesn't mean that all instruction and assessment activities must always fulfill all three standards. In some cases, repetitive practice or memory drills might help students build the knowledge and skills that can later serve as the basis for authentic performance. The point is not to abandon all traditional schoolwork, but to keep authentic achievement clearly in view as the ultimate goal.

3. Do Teaching Practices Inspire Higher-Order Thinking?

Although constructivism includes different points of view from those of authentic learning, both share certain assumptions. Learning takes place as students process, interpret, and negotiate the meaning of new information. This is heavily influenced by the student's prior knowledge, and by the values, expectations, rewards, and sanctions that shape the learning environment. Students' assimilation of new information depends heavily on whether that information helps them explain, or meaningfully extend, their past experience. Even an apparently simple task, such as learning the spelling of a word, involves this complex mental process.

With constructivism, teachers are called upon to nurture this process by leading students to engage in higher-order thinking, not just rote learning of superficial information. This means, in part, that teachers should offer students opportunities to process information through written and oral expression, as well as other avenues such as drawing, building, or dancing. Without expression, students' efforts to make and negotiate meaning will be stifled.

Constructivism also calls for teachers to abandon the primary role of "dispenser of information and truth." Instead, a teacher should
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Teachers strive to be a coach, guide and mentor who inspires students to take on the work of learning. Teachers should engage students in a “cognitive apprenticeship,” to be carried out in an atmosphere of mutual trust, collaboration, and high expectations.

4. Does Learning Result in In-Depth Understanding?

Our “construction of knowledge” criterion is consistent with the constructivist view of the student as a meaning-making person who continuously weighs new information against prior experience. But our vision goes further. Authentic performance occurs when the student reaches beyond imitation or reproduction of information and analyzes or interprets that information to solve a problem that can’t be solved by information retrieval alone. We also add the criterion of disciplined inquiry, which requires a student to demonstrate in-depth understanding using substantial knowledge from an authoritative field. Constructivism on the other hand, doesn’t necessarily require that a student’s construction of knowledge conform to knowledge considered authoritative by others.

This view of Newmann et al. is also expressed by Blunden (1997), who highlights the perspective of those who believe that knowledge and skills exist in workplace practices and are not subject to negotiation. Instead of viewing knowledge as subjective, these educators contend that there are “givens which morally, prudentially, and educationally cannot be left for learners to construct or misconstruct for themselves” (p. 46). O’Carroll (1997), however, argues that the issue is not about what forms of knowledge are defendable, but rather how knowledge is constructed and what it means to the learner. In his view, understanding is the critical factor in knowledge construction. The constructivist’s emphasis is not on learning outcomes, but about the ways people learn; and, therefore, about the process of learning that enables a learner to make connections between what is known and what is unknown.

Correlation with Brain-Based Learning Principles

Parnell (1996) contends that the greatest sin committed in many schools today is “the failure to help students use the magnificent power of the brain to make the connection between—

C Knowing and doing
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C  Academic and vocational education
C  School and other life experiences
C  Knowledge and application of knowledge
C  One subject-matter discipline and another
C  Subject matter content and the content of use” (p. 18).

“In the last few decades, brain research has shown that the need for developing connections is rooted in the basic function of the brain itself. When we teach for connectedness we are teaching in accordance with the way the human brain operates” (ibid., p. 19).

Caine and Caine (1990) have identified a number of principles associated with brain-based learning. These principles offer a basis for examining ways in which a constructivist approach to teaching and learning is congruent with the ways the brain functions. Five of these concepts are summarized as follows.

1. The brain performs many functions at the same time.

The brain simultaneously processes thoughts, feelings, visual images, and so forth. To teach in accordance with this concept of parallel processing, instructional strategies must be designed to effectively orchestrate the many dimensions of learning. Visual, tactile, emotional, and auditory learning preferences of each learner can be accommodated through the provision of multifaceted learning activities. Charts, posters, and other visuals can be used to support the learning process since the brain also absorbs information that is peripheral as well as central to its focus. Coaching practices should draw upon a variety of tools to stimulate brain functioning.

2. The brain reflects the body’s physiological and psychological state.

Nutrition, exercise, eating habits, and other reflections of health influence the brain’s ability to function and, hence, the individual’s ability to learn. The same is true for emotions as they have a great influence on the brain’s ability to recall information. Emotional stress, however, can hamper learning. Therefore, learning environments must be nonthreatening, supportive, and encourage mutual respect and acceptance. Caine and Caine (1990) note that “the brain learns optimally when appropriately challenged, but downshifts under perceived threat” (p. 70). It functions most optimally in a supportive environment in which learners and teachers are engaged collaboratively in the construction of knowledge.
3. **The brain searches for meaning.**

The brain resists having bits and fragments of insignificant information imposed upon it. It searches to create meaningful patterns by connecting relevant bits of information. Teachers can facilitate this process by allowing students to extract their own patterns, rather than asking them to repeat patterns imposed on them. Reflection can facilitate this search for meaningful patterns when it involves the learner in a pattern of thinking about what has been learned, how that learning has occurred, and why and how learning should continue. Journal writing is one strategy that draws upon the brain's search for meaning when it is designed to move the learner beyond the limits of observing and recording experiences and requires them to make meaning out of what is expressed (Kerka 1996b).

4. **The brain registers experiences automatically.**

Memory is another aspect of brain functioning that has implications for teaching and learning. The brain registers experiences automatically. Facts and skills, however, are registered differently, requiring repetition, rehearsal, and other strategies for memorization. Learning is facilitated when facts and skills are connected to experiences. For example, having students measure things in the classroom to arrange the physical space is an example of an activity to invoke spatial memory in the context of a real life experience. “Concentrating too heavily on the storage and recall of unconnected facts is a very inefficient use of the brain” (Caine and Caine 1990, p. 69).

5. **The brain remembers best when facts are embedded in ordinary experiences.**

Auerbach’s (1989) “socio-contextual model” contends that the cultural and social practices are key considerations in the development of learning. This model is based on the proposition that people learn best when the learning is meaningful to them and situated in the context of their social environments. Learning evolves from the learner’s desire to understand and construct new meanings (Billett 1996). Drawing upon cultural practices, family traditions, and other personal experiences of the learner can promote brain functioning. Constructivist-based learning is facilitated by the sharing of experiences between individuals.

For example, to enhance the English reading, writing, and speaking skills of literacy workshop participants, an instructor asked the
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participants to share their food recipes with each others. “Some participants prepared dishes popular in their cultures; some shared memories of times when the dishes were served in their family homes; and some told about the countries from which their dishes originated. Such experiences locate learning in the context of the learner’s real world, contributing to the construction of knowledge” (Brown 1998b, p. 1).

Connotation for a New Teaching Paradigm

Constructivism is an especially appealing learning theory for teachers who are trying to prepare students with skills that will enable them to succeed in a workplace that is characterized by diversity, competition, quality management practices, and teamwork. It supports the values of collaboration, personal autonomy, reflection, active engagement, individual determination of relevance, and pluralism (Savery and Duffy 1995). These practices of constructivism, however, require changes in teaching and learning. They call for teachers to modify their instruction, curriculum, and assessment practices, as well as their perspectives on what constitutes authentic learning.

Instruction

Teaching and learning from a constructivist orientation requires new ways of using time. As Parnell (1996) notes, time has traditionally been dictated by administrators and others rather than by the needs of teachers and students. Changes are needed to allow time for students to work together, perform in-depth investigations of issues, solve problems, and engage with the community to apply knowledge; and for teachers to respond to each student’s individual construction of knowledge.

A reconfiguration of class time is often necessary to enable instructors to modify their teaching approaches and incorporate constructivist practices. In Milwaukee, Wisconsin, the South Division High School has adopted block scheduling for career clusters. This schedule accommodates time for team teaching, thematic projects, and staff meetings (Rahn 1996).

New ways of teaching and learning must reflect change in teacher and student roles. Constructivist teaching places the teacher in the role of coach, mentor, and guide. Learners become the creators of their own learning. As in cognitive apprenticeships, “experts
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model the strategies and activities needed to solve problems, and learners approximate doing the activity while articulating their thought processes. Experts coach learners with appropriate scaffolds (physical aids and supporting materials), gradually decreasing assistance as through continued practice, learners internalize the process by constructing their own knowledge base and understanding (Farmer, Buckmaster, and LeGrand 1992)” (Kerka 1997a, p. 1). Scaffolding is an important concept for social constructivism in that it engages the teacher in moving the learner to the brink of his/her ability, thus advancing knowledge development.

In constructivist classrooms, the student plays a key role in directing learning. Learning occurs with teacher and learner both in the role of co-learners. As such, each has a voice in the learning process. Goals and objectives are established through negotiation, with each player having a voice in the process. With such an active role in the learning process, “students will also have to learn new ways to perform. They will have to learn how to think for themselves, not wait for the teacher to tell them what to think; to proceed with less focus and direction from the teacher, not to wait for explicit teacher directions; to express their own ideas clearly in their own words, not to answer restricted-response questions; to revisit and revise constructions, not to move immediately on to the next concept or idea” (Airasian and Walsh 1997, p. 448)

The instructional process must lead students to new understandings and knowledge construction. Teaching for understanding from a constructivist perspective must draw upon the learner’s introspective and social construction of knowledge and engage him/her in reflective thought and action. In a constructivist classroom, the instructional process guides the learner toward an activity, experiment, or inquiry that is meaningful to him/her in pursuing new knowledge. It is during the event—the activity, experiment, or inquiry—that the learner has an opportunity to think and reflect upon what is happening and what is being learned. During the sharing of new knowledge with peers, the learner is able to engage in social interaction and obtain feedback from others. With this new information, the learner can engage in the construction of new knowledge and redirect his/her thinking toward further investigation (Merriam and Caffarella 1999).

Curriculum

Curriculum must be designed to merge academic learning with its career and vocational application in the workplace. If constructivism implies that understanding is constructed through
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interpretive interactions with others in the environment of practice, education cannot be limited to the school setting. Connections must be made between the school and community, and they should involve more than the mere placement of students in work experience programs. Planning and collaboration between academic and vocational teachers, representatives of business and industry, and community members are needed to design instructional programs that combine experiential, contextual, and social methods of learning. In Philadelphia, teams of teachers participate in teacher internships, exploring various industries by interviewing human resource personnel, job shadowing, and participating in team-building exercises. Afterward, the teachers discuss ways to integrate what they have learned through their workplace experiences into their curriculum (Rahn 1996). This prior knowledge and experience in the workplace gives teachers an opportunity to construct their own knowledge about workplace applications of learning and to use that knowledge as a model for enhancing student learning as well.

Curriculum should reflect design principles that facilitate knowledge construction. Murphy (1997a) summarizes the characteristics of learning environments as espoused by Jonassen (1991, 1994), Wilson and Cole (1991), Ernest (1995), and Honebein (1996). A summary of these characteristics of constructivist teaching and learning principles follows:

C Provide multiple perspectives and representations of reality.
C Have content and activities reflect the natural complexities of the real world.
C Focus on knowledge construction, not reproduction.
C Present tasks that are realistic, relevant, and authentic.
C Provide activities, opportunities, tools, and environments that encourage self-analysis, self-reflection, self-awareness, and metacognition.
C Foster reflective practice.
C Enable context- and content-dependent knowledge construction through social negotiation, collaboration, and experience.
C Emphasize problem-solving, higher-order thinking skills, and in-depth understanding.
C Highlight the complexities of knowledge construction by emphasizing conceptual interrelatedness and interdisciplinary learning.

Curriculum should draw upon all dimensions of learning—perceptual, cognitive, and affective. Recognition of the qualities that make learners unique—their unique backgrounds, cultures, social
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orientations, beliefs, and attitudes—must also include an awareness of individual learning preferences. Not all people are drawn to the same ways of learning. Brown (1998c) describes the characteristics associated with the dimensions of learning as follows (p. 1):

**Perceptual dimension.** This learning style dimension is influenced by physical and environmental elements. The physical elements are visual, auditory, tactile, and kinesthetic. Learning styles research shows that most people learn best through experiencing, doing, and involvement (kinesthetic learners), especially when reinforcement is offered through touching, manipulating, and handling (tactile senses).

**Cognitive dimension.** Cognitive styles of learning refer to ways people process information. It reflects Kolb’s (1984) description of learning as a cyclical process by which one moves from concrete experiences, to reflective observations, to abstract conceptualization, and, finally, to active experimentation.

**Affective dimension.** The affective dimension of learning is reflected in the social interaction model described by Swanson (1995) and Griggs (1991). This model addresses how students interact in the classroom and deals with the elements of emotion, valuing, and behavior.

Each of these dimensions supports Kolb’s (1984) notion that only a small percentage of students learn by thinking and watching; most people learn best by feeling and doing, through “interpersonal communication, sharing, mutual support, team processes, and positive reinforcement” (Hull 1993, p. 50). However, the inclusion of all four styles of learning—thinking, watching, experiencing, and doing—should be incorporated in instructional practices. Collaborative and cooperative learning are several ways to expose learners to alternative viewpoints and learning styles as a means of expanding thinking and learning.

Assessment

**Assessment, from a constructivist viewpoint, must include attention to the measurement of learning that has value beyond the classroom and that is meaningful to the learner.** Multiple choice tests, true/false exams, and other traditional forms of assessment measure items the school and textbooks define as important. They emphasize “knowing that,” but do not assess a learner’s ability to “know how” or to integrate “know thats” and “know hows” into their performance (Berryman 1990).
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A authentic measures of learning require students to demonstrate through performance. The secrecy of test-taking is eliminated by providing up front the performance criteria by which learners will be assessed, as occurs in the workplace. Alternative forms of assessment, such as portfolios, journal writing, and peer reviews, are called authentic in that they assess meaningful performance that is valued in school and nonschool settings (ibid). Authentic assessments require adjustments in teacher practices, which pose certain challenges (Kerka 1995, p. 1):

- Authentic assessments require abandoning traditional notions about testing and evaluation and change teacher and student roles. They are time-consuming for teachers to prepare and implement, because they require clarity in goals, outcomes, criteria, and expectations and assurance that all stakeholders understand (Hayes et al. 1994). To ensure that evaluation standards are applied consistently, teachers and other raters need careful training (Borthwick 1995). Students need to be prepared for self-monitoring and reflection (Jones 1994). Some may be more comfortable with the traditional boundaries of grades and testing at set times.

- Authentic assessments are potentially more equitable in accommodating learning styles and acknowledging multiple ways of demonstrating competence. However, not all schools and districts may have access to some of the resources needed to develop them, and they impose demands that may challenge some students (Rudner and Boston 1994). Authentic assessments do not necessarily have to replace other forms of evaluation, but can be used to augment and broaden the picture of learner progress. Jones (1994), however, cautions that it is a mistake to use authentic assessment techniques if teachers are still relying on traditional methods of teaching, such as lectures and textbook readings.

Assessment practices should also be guided by standards and criteria of judgment to avoid an “anything goes” constructivism (Airasian and Walsh 1997). One of the challenges of constructivism is attempting to determine the relationship between truth and meaning, and whether or not some constructions are better than others. “Sole reliance on personal meaning to justify constructions leads to rampant relativism and potentially biased, self-servicing, and dishonest construction” (ibid., p. 448). However, in evaluating which constructions are acceptable, teachers run the risk of transmitting standards that they expect students to adopt, causing students to repeat what they know will earn them good grades.
grades. Some of the challenges that this presents to the teachers are reflected in the following questions (ibid., p. 448):

C On what basis should students have to justify their constructions?
C Can the teacher who facilitates the constructions also be an objective evaluator?
C What constitutes a reasonable or acceptable student construction?
C Should the teacher try to avoid transmitting standards and criteria that end up influencing or controlling the nature of students’ constructions? If so, how?
C Are evaluation standards and criteria independent of context or contextually bound?

Developing standards and criteria that allow variance in evaluation is an important aspect of teaching from a constructionist perspective. It presents a major challenge for teachers in that there are few external guidelines for achieving that balance (ibid.).

Assessments must offer opportunities for learning. To create assessment instruments that move the learner beyond recall and recognition, each assessment must be reframed so that (Marlowe and Page 1998, pp. 62-63)—

C it is, as much as possible, a continuous process that is part of instruction and not separate from it;
C it connects directly to learning and is introduced before or simultaneously with material;
C it requires students to do more than simply remember (e.g., requires students to develop mathematical formulas, produce exhibitions, write essays, create a sculpture, write poetry, create a musical score, develop and participate in debates, or create and conduct experiments); and
C student questions, at least in part, drive the process.

“The focus should be on learning, on how it is done, and on how it can be better, not on normative comparisons. Rahn (1996) suggests: ‘Ask the students how they can show you when we finish . . . what they’ve understood, what they need help with, what questions they had answered, and what new questions they have . . . talk about how it could have been better, how my teaching could have improved, how your learning can improve next week, and then we move on’” (ibid., p. 63).
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Terms

Active learning . . . . . active participation in the learning process through group discussion, cooperative learning, independent studies, etc.

Applied academics . . the inclusion of academic content in scientific and technical disciplines

Authentic assessments . . . forms of assessment that measure learning that is meaningful to the learner and can be applied in real world situations outside the classroom walls

Authentic learning . . . the individual construction of knowledge, rather than the repetition of knowledge constructed by others

Authentic pedagogy . . . instructional activities and assessments (teaching art) that require students to achieve high standards of intellectual quality

Brain-based learning . . principles that define the way the brain functions and offer guidance to teaching in according with the brain process

Cognitive apprenticeship . . . an instructional model that draws upon authentic classroom activities and guided experiences that enable the development of mental skills through reflection, articulation, collaboration, and practice, and that are situated in authentic contexts

Disciplined inquiry . . . the investigation of issues that is grounded in a field of knowledge (e.g., facts, concepts, theories) and that results in-depth understanding

Learning dimensions

Affective . . . emotions, valuing, behaviors that are reflected in interactions with others

Cognitive . . . thought processes that reflect thinking, watching, and experimenting

Perceptual . . . physical and environmental elements that reflect feeling and doing

Paradigm . . . . . . model, practice, example
Questions for Reflection and Discussion

1. How can active learning exercises be expanded to reflect authentic learning?
2. In what ways could a teaching practice be modified to capitalize on the way the brain functions?
3. In what way could curriculum be modified to all dimensions of learning—perceptual, cognitive, and affective?
4. How can the cultural and political nature of learning be addressed through constructivist-based instructional practices?
5. Why is it difficult for teachers to provide standards and criteria that allow for variance in evaluations?
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