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Learning Among the Mandates

Jacqueline Grennon Brooks
Hofstra University

The press in classrooms to cover the material and prepare students for the test is omnipresent in today's world of high stakes testing. Is there any opportunity to engage in real learning and teaching? Yes, there is! Constructivist teaching is all about the basics.

Much of today's curriculum, emerging in response to the No Child Left Behind Act, most often involves factual recall of information published with pacing schedules instructing the teacher "when" to be "where" in the curriculum. Teachers "deliver" the curriculum. But, as is well documented in the constructivist literature, meaningful education requires teacher judgment based on assessment of student understanding. Curriculum cannot be "delivered." Curriculum is a process, a process in which teachers invent strategies appropriate to the learners and the learning situation at hand. This is what we know about learning based on countless studies (Bransford et al., 2002.) However, today's educational mandates ignore research-based understandings of how people learn.

To teach within a constructivist philosophy requires active listening to students' thinking, and the capacity and the power to make ongoing assessments of students' knowledge and understandings, and adjust curriculum accordingly. To teach and learn within a constructivist philosophy requires intellectual freedom for both teachers and students in order for learning to occur at the students' leading edge. This freedom allows teachers and students to construct unifying concepts within various disciplinary fields, and this learning environment unleashes the power of the students' minds.

The now-prevalent test preparation curriculum creates and anoints one dominant perspective and fosters linear thinking. Test based environments create opportunities for students to earn acceptable test scores, but little more. And, as NAEP test results point out year after year, success on these standardized tests doesn't translate into knowledge that can be applied to more complex problems.

However, dynamic constructivist-based settings establish forums for diverse perspectives, and create the foundation for systems thinking. Students still score well on tests, but can additionally build an intellectual basis for transferring knowledge between and among different sorts of problems and issues.

Wonder, Error and Justice

We need to look beyond the test scores to see what really matters. What does really matter? Certainly, helping students find order in chaos really matters. Facts and figures and dates and events and phenomena: they all add up to chaos unless the learner starts a process that searches for connections among the pieces of their world and begins to figure out what's important and what isn't in solving any particular problem.

So instead of trying to make tests more valid and more reliable, we need to change the conversation. I suggest we look at three ideas: wonder, error and justice.

Wonder: it is a teacher's job is to keep it alive. Mortimer Adler (1940) said that the central aim of education is to "free the mind through the discipline of wonder." Error: five hundred years ago, an errant was a person on a journey, a journey in search of truth. A teacher's job is to challenge students' thinking and recognize the power of error in learning. Justice: a teacher's job is to foster it, uphold it, enhance it, and act on behalf of those whose rights to a full education may be in jeopardy because of personal or institutional bias.

Teaching Principles

There exist teaching principles (Grennon Brooks and Brooks, 1999) that help educators keep wonder alive, honor error and foster justice:

- structure lessons around big foundational ideas
- pose problems of emerging relevance
- value students' points of view, yet challenge their suppositions
- invent teaching, while teaching, as we assess student learning

Neurobiological research, although in its infant state, confirms that engagement in the types of systems thinking tasks often embedded in constructivist classrooms requires learners to use multiple regions of the brain, thereby developing neural networks that actually enhance development of the brain. “Neurons that fire together survive together and wire together (Siegel, 1999).” Neurons wired together have conductivity potentials orders of magnitude above that of a single neuron. When students engage in investigations of big ideas that invite the students to make connections and to link these fresh ideas to new systems, they enhance their future thinking.

The most important factor in changing the conversation about education is to put student performance at the center of the classroom, at the center of assessment and accountability … and, therefore, at the center of the conversation. But, it is instruction, not testing, to which we need to turn our attention in order to do such. And it is student performance for an important audience on which we need to focus.

Structuring Lessons around Foundational Ideas

Big Ideas need to be debated in many contexts. Students construct unifying concepts, concepts that cut across disciplines, by investigating data, scenarios, phenomena or events in ways that help them see patterns and interrelationships.

Think of the following lesson:

> *Some people say that blowing up this 8 foot wind sock with one breath and waving your hands to keep a bubble aloft are related. Can you see any connections?*

This is one invitation out of many directed at engaging students in an investigation of some fundamental principles of forces. The teacher of this lesson chose these particular objects (wind socks and bubbles) only after overhearing a few students taking about “how much they loved bubbles.” The quite counterintuitive relationship between air pressure and air speed (it’s inverse!) can be investigated using many different common objects. And, during the course of study and thereafter, many more of them will be used as students re-visit foundational principles in various contexts. But, using objects that are interesting to students is an example of a

knowledgeable teacher customizing the lesson plan to maximize student engagement and learning.

Posing Problems of Emerging Relevance

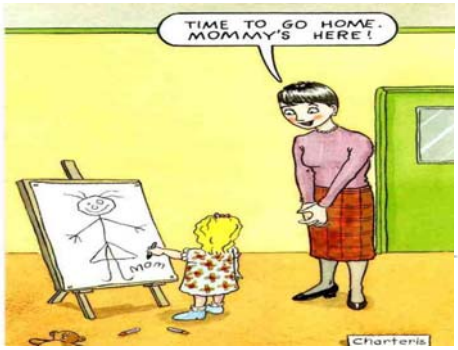
An interesting piece of information and a good question help us become both curious and uncertain, and these two attributes open us to the surprise of new insights. Think of the following lesson:

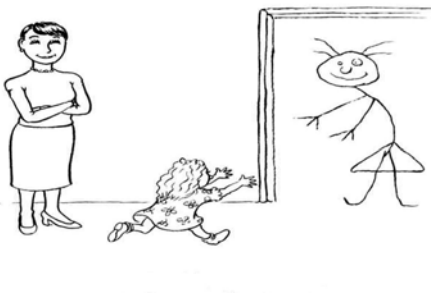
> *Using the following terms, write a brief history of Trading with Tools and Technology: Sandals, Stirrups, Sails, Standards, Subsonic Jets, Send Button*

Brief lesson plan? Yes. But a plan that requires teacher knowledge of globalization and a plan for students that requires them to ask their teacher questions, look at maps and globes, consult books and the internet, and search for patterns and trends.

Valuing Students' Points of View

Valuing students' ideas and points of view: sounds simple? What story do the next two slides tell you?





People of all ages view these slides differently. They bring different value systems, different experiences and different projections onto these two simple pictures. Who is the mother? Who is the teacher? Is the child happy at school, or not? What does the mother "really" look like? People hold very strong views about these questions after only having seen the pictures for a short time. The conversation is rich and engaging. Valuing students' points of view requires considerable thinking and the ability to reserve judgment on the part of the teacher if the teacher is to invite cognitive dissonance and scaffold classroom discourse to resolve it.

Inventing Teaching, while Teaching, as we Assess Student Learning

The simplest sounding questions are often the richest in teaching and learning possibilities. Consider this lesson:

Explain how we, on earth, no matter where we stand or what time of day or night, only see only one side of our moon.

Answering this question can take hours, and dozens of models and diagrams. Students can look at the same demonstration and see very different actions. A very valid explanation by one student can result in no further understandings on the part of other students. Yet, the same statements uttered by someone else can yield an "aah-ha!" A counter example works for some, not for others. An hour into the exploration, a mere re-statement of the original information can result in some students making new connections. It was Einstein who said that the formation of the problem is usually more significant than its resolution.

The rate of the rotation of the moon and the rate of its revolution around the earth are the same. People have a hard time perceiving a very slow rotation as a rotation. Combine a slow rotation with a revolution, and many people cannot see the rotation at all. A convincing model of the moon's rotation as it revolves requires the "modelers" to connect and integrate many frames of reference and possess the verbal skills to narrate the event. But, what is needed to provoke a learner to give up his/her former idea and construct a new one is unknown until the interaction unfolds. Therefore, it is often the case that the most appropriate education at any time for each student must be invented on the spot.

All educators have one quest: to forge classrooms in which students endeavor to make order out of their chaos. Whether we help non native speakers learn a new language, or create play spaces for pre-schoolers, or design advanced placement courses for high schoolers, teachers need a pedagogy based on current understanding of learning theory, and the support of the learning environment to customize the curriculum to the learners. Without both, it is the mandates that reign, not the learning.

The author wishes to thank Irene Plonzak and Andrea Libresco for their collaboration on a previous manuscript that informed this one. Their creativity and clarity of thought helped forge a writing group with vigor and vision, while Martin Brooks, our "in-house editor" helped us focus on what "real schools" really need!

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References

Adler, M. (1940). How to Read a Book

Bracey, (2003) "The 13th Bracey Report on the Condition of Public Education," Phi Delta Kappan vol. 85, pp.148-164

Bransford, J.D, Brown, A.L., Cocking, R.C., eds., (2002) How People Learn: Brain, Mind and School. Washington, D.C.: National Academy Press

Grennon Brooks, J. and Brooks, M. G. (1999) In Search of Understanding: The Case for Constructivist Classrooms. Alexandria, VA: ASCD

Siegel, D.J. (1999). The Developing Mind: Toward a Neurobiology of Interpersonal Experience