Authentic Education - What is a Big Idea?

Nobody can be a good reasoner unless by constant practice he has realized the importance of getting hold of the big ideas and of hanging onto them like grim death.
– A. N. Whitehead, 1929

What is a "big idea"?

An idea is "big" if it helps us make sense of lots of confusing experiences and seemingly isolated facts. It's like the picture that connects the dots or a simple rule of thumb in a complex field. For example: "the water cycle" is a big idea for connecting seemingly discrete and one-way events (the water seems to just disappear as it evaporates). "The heroic cycle" enables us to comprehend literature from many places, cultures, and times. "Measure twice, cut once" is a profound reminder about how to avoid heartache and inefficiency in building anything.

A big idea is thus a way of seeing better and working

smarter, not just a vague notion or another piece of knowledge. It is more like a lens for looking than another object seen; more like a theme than the details of a narrative; more like an active strategy in your favorite sport or reading than a specific skill. It is a theory, not a detail.

If an idea is "big" it helps us make sense of things. So, an idea is not "big" merely because it categorizes a lot of content. "Change," "relationships," and "number system" certainly encompass an enormous amount of knowledge and understanding, but these concepts don't contain much insight or direction beyond their definition. They aren't particularly powerful or illuminating on their own as concepts. On the other hand, "For every action there is an equal reaction" is a powerful idea about change: we can use it to study, organize, make sense of phenomena, and predict changes in motion. So, too, is the idea that "blood is thicker than water" powerful for understanding many relationships in societies and throughout history – and, perhaps for understanding a few puzzling decisions made by our family members!

A genuine idea is thus not a "mere" idea. It is not abstract in the bad sense, it is concrete; it is a *useful* theory; it has real impact. For example, consider a detective trying to make sense of many puzzling clues whose meaning and relationship are unclear. Any theory as to "whodunit" will

relate to motive. A good detective has some big ideas about motive to bring meaning to what might otherwise seem like odd, isolated, and unique little facts to the rest of us. The "big idea" (whether it is "Look for love triangles" or "Follow the money") is thus quite practical: it helps distinguish clues from unimportant facts, and shows the way toward more facts - and a persuasive narrative.

Similarly, in literacy or history teaching, the important "themes" are big ideas. Why? Because – if used properly – they provide learners with mental schemas or templates that help make sense of all the details of texts that threaten to overwhelm inexperienced readers. If I am alerted to "the heroic quest," or "the American Dream" I can read and think with more control and insight.

In science, the most illuminating hypotheses are the big ideas of science. So, the idea that we are all part of a "food chain" of living and nonliving things is big because it links seemingly different (and isolated) animals and plant matter into a bigger comprehensible "ecosystem" of energy exchange. We then see the role of predators, garbage, and our relationship to nature in a completely new and helpful way than before. Newton's laws of motion are three of the biggest ideas ever posed: suddenly, thousands of seemingly unrelated facts and phenomena – spoons dropping, the tides, the moon's orbit – had not only a meaningful

explanation but could be seen as part of a huge coherent system with endless predictive and connective power.

In short: think of “big” as “powerful” not as a large abstract category.

a powerful idea vs. a mere abstraction

John Dewey – as we might expect – articulated the notion of a useful idea long ago. He often wrote to describe the difference between a “genuine” idea and an idea treated as a “fact”:

Ideas are not then genuine ideas unless they are tools in a reflective examination which tends to solve a problem. Suppose it is a question of having the pupil grasp the idea of the sphericity of the earth. This is different from teaching him its sphericity as a fact. He may be shown (or reminded of) a ball or a globe, and be told that the earth is round like those things; he may then be made to repeat that statement day after day till the shape of the earth and the shape of the ball are welded together in his mind. But he has not thereby acquired any idea of the earth's sphericity; at most, he has had a certain image of a sphere and has finally managed to image the earth after the analogy of his ball image. To grasp sphericity as an idea, the pupil must first have realized certain perplexities or confusing features in observed facts

and have had the idea of spherical shape suggested to him as a possible way of accounting for the phenomena in question. Only by use as a method of interpreting data so as to give them fuller meaning does sphericity become a genuine idea. There may be a vivid image and no idea; or there may be a fleeting, obscure image and yet an idea, if that image performs the function of instigating and directing the observation and relation of facts.

- John Dewey (1910) – *How We Think*. Emphasis added.

So, we musn't equate "big idea" with a concept taught as a fact or definition. Only when we help the learner see firsthand that an idea is an inference, and one with power to provide meaning and transfer, does it become a "big idea."

The difference between a vital idea with power and a lifeless scientific notion was beautifully clarified by Nobel Physicist Richard Feynmann in discussing science instruction:

There is a first grade science book which, in the first lesson of the first grade, begins in an unfortunate manner to teach science, because it starts off with the wrong idea of what science is. There is a picture of a dog--a windable toy dog--and a hand comes to the winder, and then the dog is able to move. Under the last picture, it says "What makes it move?"

Later on, there is a picture of a real dog and the question, "What makes it move?" Then there is a picture of a motorbike and the question, "What makes it move?" and so on.

I thought at first they were getting ready to tell what science was going to be about--physics, biology, chemistry--but that wasn't it. The answer was in the teacher's edition of the book: the answer I was trying to learn is that "energy makes it move."

That's only the definition of energy; it should be reversed. We might say when something can move that it has energy in it, but not what makes it move is energy. This is a very subtle [but important] difference.

Perhaps I can make the difference a little clearer this way: If you ask a child what makes the toy dog move, you should think about what an ordinary human being would answer. The answer is that you wound up the spring; it tries to unwind and pushes the gear around.

What a good way to begin a science course! Take apart the toy; see how it works. See the cleverness of the gears; see the ratchets. Learn something about the toy, the way the toy is put together, the ingenuity of people devising the ratchets and other things. [Otherwise,] suppose a student would say,

"I don't think energy makes it move." Where does the discussion go from there?

I finally figured out a way to test whether you have taught an idea or you have only taught a definition.

Test it this way: you say, "Without using the new word which you have just learned, try to rephrase what you have just learned in your own language." Without using the word "energy," tell me what you know now about the dog's motion." You cannot. So you learned nothing about science.

In short, if the word is just a technical term rather than a vital approach, it isn’t a big idea.

Covering facts vs. uncovering understandings: avoiding the temptation to treat all scientific ideas as facts.

But teachers often unwittingly conflate terms with ideas. In their desire to make teaching more efficient, they often treat the theory or strategy as a fact related to a definition, as in Feynmann’s example. They end up turning an insightful inference into a thought-ending word. We pay for this desire to cover things ever more quickly: by treating all ideas as facts to be learned instead of inferences to be validated and

analyzed through use, we unwittingly end up inhibiting meaning and transfer. Students end up just trafficking in meaningless words; science gets treated as a foreign language rather than a body of knowledge and understanding.

Let's put this issue of efficiency vs. effectiveness in terms of the learner, the novice struggling to understand. After a few days in your room as a new student, I will likely feel overwhelmed with information; I don't yet see a pattern or a mental organizer by which I can begin to make sense of all that you are teaching me and that we are reading about. I need a helpful schema, a framework, a touchstone, a guidepost, a strategy for making sense of everything I am learning. In other words, I need a framework for my new content: I need a way to order, categorize and prioritize what I am learning.

Now, suppose we ask: if you could as teacher alert the student to a key recurring idea that can make sense of the learning as well as further it, what would it be? What aphorism, imperative, and/or rules of thumb would permit the student to make more and more sense of their work and how to be successful all year in your course? That's what we're calling a big idea.

Here are some possible answers, for different subjects and

grade levels:

- In history class: verify the source and determine the credibility of the source. Keep asking: Who said it? Why? How credible a statement is it? How credible is the source of the statement?
- In reading: Converse with the author. Assume the text makes sense. You will likely only understand the text if you assume it is meaningful and ask questions of it – if you 'converse' with the author.
- In evolution: keep remembering that the idea that mutations are random and that selection is "natural" means that there is no guiding purpose to life-form change. This is the part of the theory of evolution that is most controversial, not the idea of evolution per se.
- In writing: keep asking – Who is my audience? What is it I want them to see, think, feel, or do?

What modern theories of human learning and understanding tell us is that the learner has to be helped to "construct" understandings, not just be told them. No meaning and no transfer occur if "useful theory" is reduced to fact – even though teaching thereby becomes more efficient. The distinction between "knowledge" and "understanding" (or, if you like, "facts" and "genuine ideas") is not merely semantic. We slowly come to an understanding, as a result of using

facts and ideas to make sense of things. (Facts are apprehended, ideas are comprehended, in Dewey's original formulation). "Teaching" an understanding is as counter-productive as "teaching" someone to be honest. Learners have to see the power of honesty and the unforeseen consequences of dishonesty before they can truly commit to honesty as a value.

The real harm of stressing that ideas are merely words, phrases, and statements with technical meaning (instead of the power they represent) is that such teaching tends to end thought rather than further it. Rather, a big idea is alive. We develop understanding by extending and challenging understanding. A big idea reaches out, it pushes against boundaries, it asks us to possibly rethink other things we thought we knew. It raises questions and problems - and thus, generates new ideas. We see new connections and we initiate inquiries to validate or critique the idea. A big idea activates thought and permits transfer – and, thus creativity. "Coverage" of an idea, by contrast, kills it: our job is not to think with ideas but just learn stuff. The best teaching does the opposite. It brings seemingly inert content to life. And in science it reminds us that today's Big Idea is potentially tomorrow's discredited notion. This is key to empowering the student: there will always be room for new ideas in any authentic teaching of science as fallible theorizing.

The article Jay McTighe and I recently wrote for *Educational Leadership* called 'Put Understanding First' makes the point in a different way: both teachers and students need to understand that there are three different educational goals always at play: Acquisition, meaning-making, and transfer or prior learning. Here is a brief excerpt from the article (which was in the May 2008 issue, on High School Reform):

> To better explain what curriculum needs to be, we think it is helpful to distinguish what are in fact three different yet interrelated academic goals of high school -- students should be helped to: 1) acquire important information and skills, 2) make meaning of that content (i.e., come to understand important ideas), and 3) transfer their learning to new situations, effectively. In this paper, we will refer to these three key learning goals as A-M-T. Acquisition is a means; meaning making and transfer are the ends.

> The categories should seem intuitively sound. A fact is a fact; a skill is a skill. We acquire each in turn. To ask, however: What do these facts imply? Or: When would I use this skill (or not)? is to ask what those facts and skills mean. A third question can also be asked: How should I apply my prior facts, skills, and ideas effectively in this

> particular situation? This question is about transfer. I must take what I have previously acquired and understood, and see how it can best be used in a particular and novel situation. Thus, when we speak of "learning for understanding," we really are referring to two different long-term aims: meaning making and transfer, utilizing previously acquired knowledge and skills – our short-term goal.
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> While such a classification scheme is not new or radical (see Dewey, 1933 ; Bloom, 1956 ; Marzano, et. al. 1992), the distinctions are real – and critical to intelligent planning, purposeful instruction, and valid assessment. Put simply: if you want understanding and transfer, you have to design backward from it.

Any understanding, essential question, or transfer task is made up of a big idea; it is built out of it, in other words. So, making a question using a big idea turns into an essential question. A food chain is a big idea. "On what energy do we depend and how can we ensure access to it?" is an essential question about that big idea. While it is true that sometimes when asked to name a big idea we frame it instinctively as a question or a statement, sometimes we just express it as a

phrase or word.

We first started talking about “big ideas” to help those using the UbD template who did not find it easy to come up with essential questions (and understandings). People were often inappropriately trying to come up with a factual question, such as: "What is a food chain?" So, we would say, "No, that is a factual question that is answered in the book." We would follow this up by asking them: "So, what’s the big idea about the fact? What does the idea of 'food chain' help us to see or understand better?”

Our hope was that this additional step might ease the transition from focusing only on “content” to focusing on learning content for understanding. Alas, some people heard the phrase differently: they thought the phrase “big idea” was synonymous with “understanding” Or “question.” Others, who had no trouble coming up with questions and understandings, then wondered if they had somehow missed something by not also coming up with big ideas. So, they would ask: “Why is there no box in the template for big ideas?”

"Big idea" doesn’t have its own template box because many boxes in the template should refer directly or indirectly to big ideas. If I say “audience and purpose” that’s a phrase representing a big idea in writing and reading. If I ask: “What is my purpose and who is my audience?” I am

acknowledging the importance of that idea and framing it as an essential question. If I say "Great writing, like great art, is a function of utter clarity about purpose and audience," then I am proposing a specific understanding about that idea. If I ask you to write the same piece for two different audiences, I am asking you to transfer your grasp of the idea in writing. (Note, therefore, that we both may agree on the importance of "audience and purpose" as an idea but propose different "understandings" about it.)

So, what makes an idea *big*? An idea is *big* if it helps us make sense of lots of otherwise meaningless, isolated, inert, or confusing facts. A big idea is a way of usefully seeing connections, not just another piece of knowledge. It is more like a lens for better looking than something additionally seen; more like a theme than the facts of the story.

In the language of UbD, a *big idea* is a powerful intellectual tool, from which we can derive more specific and helpful understandings and facts.

A true idea doesn't end thought, it activates it. It has the power to raise questions and generate learning. So, build your unit around one idea with power, an idea that helps learners make sense of otherwise isolated content and which cannot help but bring inquiry to the fore.