

# Reading Discussion - Bransford & Donovan

The authors focus on three key aspects on science teaching:

- preconceptions
- knowing how to do science
- metacognition

Pick one of these three and explain how it relates to your teaching (create a new discussion)

Please comment on two other people's posts.

## ***Metacognition in the Inquiry Process.***

***by James Rice - Monday, September 5, 2016, 4:16 PM***

*Having adopted, more or less loosely, the use of interactive science notebooks a few years ago, I have struggled with this a lot. In large part, I haven't had the greatest success interpreting the intent of the author of that book (Kellie Marcarelli, "Teaching Science With Interactive Notebooks") and honestly I haven't had the time to really go back and re-read every detail once off and running with the notebooks. While the notebooks are an invaluable tool for me to keep students organized (it is now the rare student who totally loses assignments, and they frequently use their saved assignments to quibble about assignment grades that I post online) I feel I've more often than not poorly implemented the reflective piece of the notebook. I've given students guidelines in the past of some general "self-reflection" questions they can ask themselves as they go along in the process of using their notebooks and pursuing inquiry, but it's really just been flailing for lack of any concrete set of topics I should be addressing.*

*The reference that Bransford and Donovan made to the "reflective assessment" component of the ThinkerTools program was really useful as it has now given me some categories on which to focus in my quest to create good meta-cognitive questions. However, I am really pretty desperate to see how somebody else might implement this in detail. Because, while having categories is helpful (understanding the main ideas, understanding the inquiry process, being inventive, being systematic, reasoning carefully, applying the tools of research, using teamwork, communicating well) I am not sure how, or when, to ask questions in any of these categories.*

*In all honesty, I chose to get into the master's program because I intend to use the units for a salary increase, but because I still have some intellectual integrity, I can't just read material like this and let it go. I don't really get the impression from any of my science department colleagues (including the two who HAVE master's degrees in education) that they think along the lines of any of these categories, but when I see the raw data for performance jumps from the pre- and post-testing of the students in the ThinkerTools example, I get excited to see this implemented.*

*And, also, in all honesty, I get really frustrated that we don't have these master's degree classes in the summer time when it isn't already too late to re-tool my curriculum. As it is, LAUSD is three weeks into the school year and I've mostly got my sequence planned out and a couple of units fairly solidly "realigned" to the NGSS, but now I have more questions and doubts than I did at the beginning of the school year only three weeks ago.*

*This, however brings me to a point that I made in response to somebody else's post, which is student fear of failure. In my own case, I believe I am being evaluated by my principal this year and that always makes me a bit anxious. On top of that, I walked into class on the first day and*

*felt put on the spot for my area of greatest weakness, which is student experimentation and labs. In addition, I always have the concerns of my students and my inner concern that I might be doing them less of a service than I could when I see the big bad world and the battles these kids are facing and will face even more when they leave my classroom. Then, to cap it all, there are my own expectations for myself which, now, feel shot to hell. In other words, I have pressure from above and below as well as on the horizontal level externally and internally. And, as an adult, I'm not supposed to complain. All of which leads me to be anxious about being "wrong" and even worse being seen to be "wrong" by others.*

*I believe, in their own teenage world, our students have the same pressures. For academically oriented students, their parents and fears for their careers and futures put pressure on them; when tests roll around both from the school as well as the district, state, and even national levels, there's pressure; and when they see their peers and consider how they might measure up - and how they might have to compete for jobs, college entrance, and scholarships, there's just more and more pressure. It's for these exact students who may or may not even be aware of their own levels of anxiety that, I believe, a certain level of regular self-reflection on their learning process may be vital, but also for whom I believe I'm going to need to develop strategies to use these self-assessments to help build up a positive self-image for them as being not only competent scientists but powerful learners who have a interior locus of control.*

*Because, for all the pressures I listed above for academically-inclined students, at my school I probably have an equal number or more who subtly don't care and believe that as long as they "do their work" they'll get C's and survive high school. For them, I don't think they've ever really exercised their higher-order thinking skills in a classroom and the few times that they've been*

*challenged to do so, unless it has been with a teacher who is very skillful, they have probably met with levels of failure that have convinced them that their own negative self-conceptions were adequately correct to warrant avoiding such failures again.*

*In other words, the "fixed mindset" vs. the "growth mindset" that are popularly talked about these days in education seem to be psychological self-conceptions that students hold falsely – false self-pre-conceptions, if you will – and that, with skillful use of metacognition, we teachers should be able to help students shift students to more accurate models alongside their changes in scientific models.*

*Frankly, as an educator, if my students' scientific model changes were regularly surpassed by their self-model changes by the time I was done with this course of study, I would consider myself a definitive success.*