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## When Is a Good Day Teaching a Bad Thing?

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**H**ave you ever had one of those days teaching where, at the end of the day, you are able to sigh and pat yourself on the back because it was a “good day?” You know the kind — where all the class interruptions were manageable, most of the students turned in their homework, you got through exactly the amount of material you planned, the students mostly sat quietly and were able to answer the questions you posed, and asked you questions you were able to answer. All in all, this is the textbook definition of a “good day” in the classroom. Truth be known, most science teachers would be ecstatic if this description occurred once each week!

Now, before you get too excited that this is the perfect Utopia, allow me to pose a few seemingly simple questions about your class. How much deep thinking were the students really doing? How do you know? Did you ask students, “Does everyone understand?” or did you craft a series of particularly thought-

provoking questions to check specifically for depth of understanding and students’ abilities to transfer ideas across conceptual boundaries? I submit to you that when everything seems fine, it is probably the perfect time to carefully find out exactly what depth of learning is actually occurring in your class.

Many teachers and students adhere to what might be called a “Hidden Contract.” This Hidden Contract has been agreed to and reconfirmed by teachers and students since antiquity. It reigns in elementary school classrooms and collegiate lecture halls alike, and goes something like this. First, the students’ responsibilities are to sit quietly, write down everything the teacher puts on the board, politely and frequently ask for points of clarification, and memorize their notes, summary review sheets, and text for the exam. They are required to do well on the exam as well as promptly forget everything that they obediently memorized last year. Students who break this contract by coming to class late, posing questions about the actual real-life relevance of the material, or failing to adequately memorize the material are considered to be troublemakers or unwilling to play the game of “school.”

On the other hand, the Hidden Contract stipulates that it is the

teacher’s responsibility to clearly organize and present lectures, preferably enthusiastic ones, to describe numerous and often creative examples, to assign exercises that allow students to practice tasks not terribly different from the examples given in class, and to narrowly specify the curriculum aspects that will be covered on the next exam. The Hidden Contract clearly stipulates that teachers who provide avenues for extra credit, who tell humorous anecdotes in class, hold detailed exam review sessions that further delineate the possible test questions from a wealth of possible questions, and are flexible on assignment due dates are held in the highest regard. Teachers who break this Hidden Contract by writing test questions that are either ambiguous or go beyond the examples presented in class are labeled as being unfair, unresponsive, or simply just bad teachers.

In short, this time-tested Hidden Contract tells students how to behave in class and what they must memorize to earn an A, as well as guides teachers on how to get as many students as possible to earn passing marks in their classes and maintain a reputation as a good teacher. The students get what they want. The teachers get what they want. Everyone’s happy.

Unfortunately, our Hidden Contract allows what is seemingly a good day teaching to mask an authentic deficit in student understanding. All too often, teachers ask students if everyone understands and students respond by nodding in the affirmative. Teachers trying to encourage discussion pose students low-cognitive-level questions (“What is the charge on an electron?”), and students ask the teacher low-cognitive-level questions in response (“If a panda is actually a marsupial, what is a koala classified as?”). A classroom characterized by low-level questions masquerading as a class discussion is just as educationally useless as cookbook laboratory exercises that have the outward appearance of hands-on inquiry activities. The real question we need to ask ourselves is, “Did I push really hard on the envelope of student understanding today?”

Good teaching is complex, and, when it is done right, causes great frustration for both parties. Learning can only happen when students are dissatisfied with the fruitfulness of their preexisting notions. Cognitive research tells us that students don't come to class ready to have knowledge dispersed to them; rather, students come to class with a host of prior knowledge and beliefs about the world that fundamentally impact the attainment of your learning goals. Time and time again, tests like the Force Concept Inventory and the Astronomy Diagnostics Test confirm that students have extensive naive beliefs about how the world operates, both before and sometimes after instruction.

To be fair, there is a paramount reason that schools subscribe to the Hidden Contract — discipline. For

whatever reason, many of us have a deep-seated notion that students should sit quietly in rows and be obedient at all times. The Hidden Contract supports this idea and provides a mechanism to ensure that classrooms run in an orderly fashion.

The new teacher can be assured that breaking the Hidden Contract will invite some “acting-out” behaviors on the part of students. What might startle you is that the students typically classified as high-ability students can be surprising culprits. This is so because such students have learned over the years how to be very good at “doing school.” When a teacher pushes their understanding by going beyond low-level declarative knowledge, these students feel like the Hidden Contract is broken and that they don't know exactly what is expected of them. In other words, they don't know the exact recipe to “earn an A” — so they act out. Teachers who breach the Hidden Contract must be prepared to use their well-honed classroom-management skills. Yet, I submit to you that a high-quality learning environment can result and that the venture is worthwhile.

Teaching for deep understanding instead of simple factual recall is a tough challenge — but a worthy one. Teaching and testing for factual recall often results in students getting passing grades, but what will they remember this time next year? On the other hand, teaching for understanding means challenging students to create their own analogies, to bridge across concepts, and to synthesize deeper meaning and relevance so that they can have flexible knowledge that works in a wide variety of contexts. And, yes, it takes a lot more time

than having them memorize the bold-faced words. At the end of the day, rather than asking students if “everyone understands,” a philosophy of teaching for understanding means carefully crafting specific questions to your students so that both of you know exactly what they understand and where their difficulties lie. In the present instance, instead of asking you, “Do you understand this article?” or “What is the Hidden Contract?” I pose to you, “Can you create three ways to purposefully breach the Hidden Contract to help students understand better?”