

COMPILATION:give the correct answer? (part 1)

Date: Wed, 24 Oct 2001

From: HughesMark@aol.com

A reading teacher named Dr. Chris Street had an incredible insight that I find extremely useful in guiding student, parent, and administrative concerns. "What we as teachers mark determines what students value in an assignment." He argued that if an English teacher assigns an essay and marks "Poor Spelling -- 15 errors -- C+," the students decide that correct spelling is the mark of a well-written essay. They might turn in a new essay that receives a comment of "12 grammatical errors -- B-" where they learn that proper adherence to the rules of the English language is the mark of a true writer. All along though, the entire goal of the English teacher has been on the writing process, the spelling and grammar are secondary, but the student is generally focused on the spelling and grammar.

As he was saying all of this, I began to smile as I realized that by giving the students the correct answer to a problem we focus their attention on the correct answer and not the process.

Date: Thu, 25 Oct 2001

From: Marc Reif <mreif@FAYAR.NET>

Mark Hughes wrote:

'As he was saying all of this, I began to smile as I realized that by giving the students the correct answer to a problem we focus their attention on the correct answer and not the process.'

I think what you mean is that by grading for the correct answer we focus their attention on it. I often give the kids the correct answer before they do an assignment in hopes that it focuses their attention on the process.

Date: Thu, 25 Oct 2001

From: Maria Consuelo Rogers <mcr@LAVA.NET>

I agree with many of the science teachers I know (physics, chemistry, biology) who put more emphasis on the "work" {thinking process} that a student demonstrates on his/her paper. My students (I teach chemistry and physics most of the time) know and understand that the "correct answer" is not so important as the process of arriving at an answer. (Although of course an inaccurate final answer still has some bearing on the entire grade for the question) In other words, a "correct" answer without the "work" is worth very little.

A perfect score on a question takes into consideration: the process and an accurate answer. Sometimes students come up with an approach to a problem different from what I expect, and if their reasoning makes sense and they arrive at the answer with accuracy, they are given a "perfect" grade on that question.

How do they show their "work"? I ask them to write a narrative (or express the concepts they are applying to the question, in mathematical symbols) about what they are doing. It takes longer, but this also eliminates students copying (only) answers from another student's work.

For example, the other day I had students practice writing chemical formulas for ionic compounds. They were referring to an Ion-chart but I asked them to explain how they come to their answers. i.e. show that the total ionic charge equals zero (specially with polyatomic ions

involved) but for the simple binary compounds I asked them to draw atom diagrams and "show" the electron "transfer" etc. When they whiteboard their work, they articulate on how they arrive at their answers. They are required to explain their answers - yes even on the tests.

Date: Fri, 26 Oct 2001

From: Jason B Lonon <j_lonon@LYCOS.COM>

Knowing Mark, I think he meant what he originally said. I feel the same way. It is sort of like Pavlov's dogs. If you continually give students a numerical answer to a problem, they quickly learn that they don't need to do work on their own or reflect on their answer, because you are just a statement away. At best, we lead them to believe that a decision making process can be judged by a final numerical answer, which I'm not so sure is a valid assumption.

By giving a numerical answer before the problem is attempted, I believe we are making that answer the judge of our process, instead of the letting the rules of physics be our judge. Therefore, students see physics as a strange, unordered mix of rules that are created on the spot just to get a certain answer that should be true. In my experience, this causes students to learn to think backwards, and they CAN'T think forwards, which is what I want. I would imagine this is a hot topic, and that I am probably in the minority, but I still thought I would try to explain what I think Mark was referring to earlier.

Date: Fri, 26 Oct 2001

From: Gene Newman <emnewman@TOAD.NET>

On giving the answers: I agree. In AP classes, I emphasize well presented solutions over answers, I often give the answers. This causes two effects. First they can focus on process and presentation. Second, if the answer does not match they get used to reviewing their solution.

Date: Mon, 29 Oct 2001

From: Jason B Lonon <j_lonon@LYCOS.COM>

If you give students a numerical answer before they do the problem, how do you get them to argue about which team has the more rigorous process? How do you get any arguments at all? My students would just submit that the group who 'got' the numerical answer I provided was correct, and would not bother at trying to defend their own position.

Date: Tue, 30 Oct 2000

From: Mark Hughes <MJHughes@HUGHESMARK.COM>

I have been on a field trip with students for the past few days and am quite surprised by the responses to my "what we as teachers grade determines what students value in an assignment" quote by Dr. Chris Street. It was like a giant game of telephone where the message traveled from me in Anaheim California, to Marc Reif in Arkansas, to Maria Consuelo Rogers in Hawaii, and finally to Jason in North Carolina. I wish to thank Jason for clearing up an increasingly garbled message.

Being the attention seeker that I am, I offer the following thoughts regarding Socratic questioning -- I quote Marc Reif multiple times only because he was the first person from which further messages developed.

Assessing the way students are taught: In response to the comment on Oct 25, 2001. "I often give the kids the correct answer before they do an assignment..." Students are not given the correct answers to tests while they are taking the test and asked to determine what fits in the middle -- they often do not receive the answer for a few days afterwards, and in the case of standardized tests -- weeks or months may pass. I believe that if we are to teach students the way they are assessed we cannot give the students the answers prior to the test. While the prospect of knowing the answers to questions might ease the discomfort of my students, it does not support the success of my students.

In response to the comment on Oct 25, 2001 "...in hopes that it focuses their attention on the process" I have experimented with different teaching styles in my classroom (discrete trial -- where the correct answer is given immediately & continuous trial -- where the correct answer is not given immediately, if at all). I find that the continuous trial approach makes the students the most uncomfortable initially -- but they spend more time with a question, and in the end, they learn more. It makes them question their every thought -- to justify it with their view of the world. The students have no choice but to focus on the process and their thoughts -- they become their own best resource.

The continuous trial approach opens up a slew of colors in an answer that was previously black and white. A very loose analogy might be made by asking students if they think abortion is right or wrong, telling them the answer, and then asking them to justify their response. Who will be there to give them the answer when we ask them about genetic engineering? When students are given the answer to a problem, they can easily set the answer and the process aside, forget about it, and then remember they forget it when they are asked to solve it again.

Consider giving a difficult quiz question one day and then giving the identical question the next day and investigating the results. The student who is not given the answer will be better prepared to go through the same process that they went through previously to solve it -- except now they've practiced it and can go through it much quicker. The student who is not given the answer spends much more time with the problem than the student who is given the answer. Call me a control freak -- but I like that.

I do not expect my students to be scientists when they leave my classroom, but I do expect them to think like they are one. As Feynman says "What I cannot create, I cannot understand." And if I don't get to that point, at least I can make them question a thing or two.

Arnold Arons was a fantastic proponent of the importance of language in teaching. Along somewhat of a tangent, I offer the following information I acquired from my former work with severely handicapped children in a special day class setting:

In the discrete-trial model, every question posed by the teacher (S.D. -- discriminatory stimulus) is followed by an answer from the student (B -- behavior) and then reinforced by the teacher (S.R. -- reinforcing stimulus) SD -> B -> SR. To help a student to be successful, the teacher might introduce a prompt between the question (S.D.) and the student's answer (B). SD -> P -> B -> SR The prompt might include any of the following (and many others):

1. Hand-over-hand prompting -- Physically motoring a student through a process

2. Gestural prompting -- pointing in the direction of the desired response
3. Proximity prompting -- placing the correct answer closer to the students dominant hand and the incorrect response further away
4. Modeling -- performing the desired behavior for the student to watch and imitate (doing a problem and asking the students to recreate it)
5. Inflection -- change vocal patterns to influence student's response ("Johnny, is the answer THREE or four?" This is the same type of prompt used by McDonalds when they tell you that "You WANT fries with that."

I spent a moment considering the language of Marc Reif when he said "I think what you mean is....." (I realize that at this point that I seem to be drafting a personal letter to Mr. Reif, I only use his e-mail because it is the one on top of the pile in front of me) While I am certain that Mr. Reif meant in no way to demean or correct my previous statement (<-- did you see the prompt there -- both in my diction and his?), students can read the patterns and prompting styles of teachers and use those to elicit the answers from teachers almost as easily as if the teacher handed them the answer. They've done it to me on many an occasion. Just another thing to consider as we wander along this crazy teaching path.
