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Deep Learning vs. Surface Learning: Getting Students to Understand the Difference

SOMETIMES OUR understanding of deep learning isn't all that deep. Typically, it's defined by what it is not. It's not memorizing only to forget and it's not reciting or regurgitating what really isn't understood and can't be applied. The essence of deep learning is understanding—true knowing. That's a good start but it doesn't do much to help students see the difference between deep and surface learning or to help persuade them that one is preferable to the other.

Those differences are further obscured and rendered unimportant when teachers use superficial measures (e.g. multiple-choice questions that test recall) to assess understanding. Why do students memorize isolated facts that they don't really understand? Because, in many courses, that approach has rewarded them with good or at least decent grades. Until teachers stop relying on questions that can be answered with details plucked from short-term memory, there isn't much chance that students will opt for the deep learning approaches.

Most teachers (especially those who read a blog like this) recognize that test formats directly affect the choice of study strategies. We are committed to preparing questions that require higher level thinking skills. Our students discover they can't answer those questions with the easy information bits they've memorized and so they start studying differently. The problem is that without teacher guidance, students end up selecting deep learning strategies more by accident and less by design. That challenge is answered by knowing what constitutes a deep learning strategy.

In an article reporting on the success of certain test question formats to promote higher-level thinking skills, faculty researcher Kathrin Stanger-Hall includes a list of study strategies characteristic of surface and deep learning. Because students can be physically active (doing things) but without much cognitive involvement, her list differentiates between cognitively passive learning behaviors and cognitively active ones. She includes references to the literature justifying this distinction. Below are some samples from each list. The full list can be accessed via this article: *www.lifescied.org/content/11/3/294.full*

Cognitively passive learning behaviors (surface learning approaches)

- I came to class.
- I reviewed my class notes.
- I made index cards.
- I highlighted the text.

Cognitively active learning behaviors (deep learning approaches)

- I wrote my own study questions.
- I tried to figure out the answer before looking it up.
- I closed my notes and tested how much I remembered.
- I broke down complex processes step-by-step.

Lists that are this behaviorally focused do oversimplify complex processes like deep learning, but they are still enormously helpful at making clear what deep learning might look like when you try to do it. Researcher Stanger-Hall included both kinds of behaviors on a survey that she had students complete at the beginning, during and at the end of the course. Her students identified which of the behaviors they were using as they prepared for course exams. It's a creative assessment technique she used to document whether having to answer some test questions not formatted as multiple-choice questions changed the approaches students said they were using to study. Her data show that it did. (Look for highlights from this study in an article in the December issue of The Teaching Professor.) Not only did students in the experimental group use more of the deep learning approaches, but their exam scores were significantly better than those in the control group. When you can show students that certain approaches to studying improve exam scores, you've given them a compelling reason to try them out.

A final thought

Maybe I've been writing this blog for too long. I'm starting to repeat points made in previous posts. But it is terribly important that in explicit and concerted ways we make students aware of themselves as learners. We must regularly ask, not only "What are you learning?" but "How are you learning?" We must confront them with the effectiveness (more often ineffectiveness) of their approaches. We must offer alternatives and then challenge students to test the efficacy of those approaches. We can tell them the alternatives work better but they will be convinced if they discover that for themselves.

Reference: Stanger-Hall, K. F. (2012). Multiple-choice exams: An obstacle for higher-level thinking in introductory science classes. *Cell Biology Education—Life Sciences Education*, 11 (3), 294-306.

Maryellen Weimer, PhD in Teaching Professor Blog; Deep Learning vs. Surface Learning: Getting Students to Understand the Difference; November 19, 2012, [http://www.facultyfocus.com/articles/teaching-professor-blog/deep-learning-vs-surface-learning-getting-students-to-understand-the-difference/], December 3, 2012.

Spring Registration (new) - Dec 3
Classes End - Dec 7
Exams - Dec 10-14
Commencement - Dec 15
Grades Due - Dec 17
Holiday Break - Dec 23-Jan 1

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Gimme an A!
Confronting Presuppositions about Grading

SOMETIMES, in informal conversations with colleagues, I hear a statement like this, "Yeah, not a great semester, I doled out a lot of C's." I wonder, did this professor create learning goals that were unobtainable by most of the class or did this professor lack the skills to facilitate learning? I present this provocative lead-in as an invitation to reflect upon our presuppositions regarding grading.

Most of us hold deeply rooted presuppositions about grading that have rarely been confronted, and this makes sense. We became specialists in our fields without having learned a variety of grading strategies, purposes, and theories. We never had to interrogate our presuppositions about grading nor have our institutions supported us doing so. At our college, for example, we have a grading percentage chart, suggesting a range of grades might be used for a class, and a line that appears on all official course outlines stating, "Evaluation and assignment of grades will be based upon the quality of work produced relative to the objectives of the course." This, of course, is vague enough to confound students and to allow the use of just about any grading strategy.

I began confronting my own grading presuppositions with a somewhat radical idea that I've now tested over three semesters, with the full approval of our Dean. During the first class of an upper-level course, I go over the course outline and grading rubric with the students. Afterward, I ask them if they will do all the work. They usually give me perplexed looks while agreeing. In response, I inform them that they will each receive an A for their final course grade. Some students loudly proclaim, for the sake of peer witnesses, they are writing it down.

In undertaking this pilot-project, basically a form of contract grading, I was required to deeply reconsider the way I understand student attainment of outcomes and my role in their meeting such outcomes. In each class that I have tried this approach, I have observed that students' attendance, energy, intrinsic motivation, and level of work are equal to or higher than that of classes where I have used typical grading strategies. (I have had less luck with contract grading variants at lower levels.) Students are quick to provide feedback. They state, in ongoing feedback forms and in their end-of-year course evaluations, that the lack of stress regarding grades and not having to figure out ways to please the teacher really allowed them to engage, express themselves, immerse themselves in complex material without always worrying about the correct answer, and, most importantly, to learn.

This pilot-project makes some of my colleagues uncomfortable. They suggest that an average grade, a C, is good and they speak of grade inflation. Or they say I have the luxury of this project because I teach in the humanities field and this grading strategy can never work for the hard sciences. There is lots of room for discussion. The main point of objection is to bring up the hypothetical student who won't do the work. So far, there has been no such student in these classes. If there were, I would intervene early and often, and if that failed, the contract is based upon the student's agreeing to do the work.

Generally the arguments against giving all students an A seems to stem from a main presupposition: that all students cannot succeed at a high level, that the purpose of grading is a process of selection. The idea, when pressed, seems to be both vague and deeply held and is usually exposed by phrases like, "That's just the way it is," or, "All students do not have equal abilities." The philosopher R.G. Collingwood would call this an absolute presupposition of which he wrote, "people are apt to be ticklish in their absolute presuppositions" meaning they don't enjoy being confronted about them. Imagine if teachers were called into the Dean's office and the conversation went something like this: The fact that many of your students are only reaching an average level of work and comprehension is a reflection of your ability to facilitate learning — what can we do to improve it? (I told you at the beginning of the article that I would be provocative.)

I am suggesting that, regardless of whether one agrees with my position or not, we all hold presuppositions about grading that affect the way we use grading to support learning. If our job is to deliver content, facilitate learning, to scaffold difficult material, and to assist all students in achieving the outcomes of our courses, then from my point of view something is wrong with what we are doing if most of our students are not achieving the top levels of comprehension. I think it's worth thinking about, deeply.

Reference: Collingwood, R.J., (1939). *Essay on metaphysics.* Chicago: Henry Regnery, (p. 31).

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Christopher Willard in Educational Assessment; Gimme an A! Confronting Presuppositions about Grading, October 29, 2012 [http://www.facultyfocus.com/articles/educational-assessment/gimme-an-a-confronting-presuppositions-about-grading/]; December 3, 2012.

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