Teaching For Deep Learning

Would you like your students to become deep learners? Here’s a simple approach to accomplish your goal.

Do you and your trusty sidekicks, a computer and textbook, show up for class each day… because you want to help your students obtain an education that nets them high-paying jobs… because your chair likes to lurk in the hallway… because your paycheck necessitates it… or perhaps because you want to aid your institution’s administrators in their quest to obtain high retention and graduation rates?

On the other hand, if you’ve decided that the real purpose of higher education is to instill deep learning (what Fink calls “significant learning experiences” and others, life-long learning) in your students, do you really know how to reach this goal? Do you keep current with pedagogical research? Have you noticed what brain scientists have recently discovered about learning?

Times have changed quickly. The “Sage on the Stage” is on life-support, and even the “Guide” is being forced further to the side by the “Mentor from the Middle” (see our “Teaching Creative Thinking and More”). Unfortunately, while professional development, especially in pedagogy and technology, is something we all know we need, time-stressed instructors often find it difficult to obtain.

Fear not, for in the next few pages we’re going to provide a short course that will not only catch you up on the research, but make your students what you desire to see — deep learners.
The Four Rs—Receive, Retrieve, Rate, Reflect

Are you old enough to remember when your elementary education was called “grammar school”? Were the three Rs of reading, writing, and arithmetic drilled into you with a hickory stick? From the Industrial Revolution through the 20th Century, the three Rs constituted the basics of a good education. But today the subject matter for an education has expanded, and research has demonstrated more scientific ways to learn. For instance, instructors once encouraged students to read and then reread as a way to be certain one learned the material, but we now know that commandment to be wrong.

IN ORDER TO PLACE INFORMATION IN THEIR LONG-TERM MEMORIES, STUDENTS MUST GO THROUGH THE PRACTICE OF RETRIEVAL.

As we point out in Achieving Excellence in Teaching: A Self-help Guide (2014), knowledge should be transferable and not mere surface learning (e.g., that which is crammed for a test): “Unlike surface

TALES FROM REAL LIFE > THE FOUR R’S

In a recent course, CRE 201 Creativity and Innovation, students focused on developing innovative concepts and ideas through applications of creative thinking. Their projects were largely problem-based, and the activities were focused on using creativity to develop innovative solutions. Information was often delivered visually with the expectation that students would be inspired and that class discussions and exercises would build momentum organically. My intent was not to tell students what to think but to encourage them to think. How students received content could not lend itself to the prescriptive but needed to foster innovation and invention while also challenging students to draw on their past experiences from class or life — to practice retrieval. In addition, students grounded their approaches based on information retrieved from the course text or supplemental readings and viewings. While the focus of the course was creativity, each project required students to present and rate their projects. This critical thinking encouraged students to consider what they would have done differently if they had more time or different directions for solving problems that became apparent during the process. At the end of each major project, students had the chance to reflect publicly, building off of one another’s ideas, questions, and concerns. The “Four R” approach certainly enhanced my CRE 201 students’ learning.
learning, deep-learning students synthesize (rather than memorize) ideas in order to
develop a conceptual understanding—i.e.,
the new information takes root in their
basic apparatuses for apprehending the
world—and to make meaning out of mate-
rial under consideration” (11). Simply put,
inculcating deep learning in your students
can be achieved by utilizing the four Rs.

Receive!

Like a computer, the student mind needs
to receive information to function. Many
delivery systems exist from on-the-ground
to online, lecture (with or without Power-
Point) to mini-lecture, and many formats
can be utilized (e.g., the flipped classroom).
The keys are brevity and variety: after 10
minutes of any mode of concentrated in-
struction (see Medina), student attention
wanes. If the average person is willing to
spend only 12 seconds on a website, how
long does it take before students click out
of their reception mode? Still, without new
information to add to old knowledge, new
knowledge cannot be created.

Retrieve!

In order to place information in their long-
term memories, students must go through
the practice of retrieval. As Brown, Roedig-
ger, and McDaniel point out in Make It
Stick: The Science of Successful Learning
(2014), “Learning is deeper and more dura-
ble when it’s effortable” (3). But not all
effort is the same. In fact, the authors
stress that “Rereading text and massed
practice of a skill or new knowledge are by
far the preferred strategies of learners of all
stripes, but they’re also among the least
productive” (3), as is the “popular notion
that you learn better when you receive
instruction in a form consistent with your
preferred learning style” (4)—e.g., auditory
or visual learning.

STUDENTS MUST LEARN TO
REFLECT UPON WHAT
THEY LEARNED AND
HOW THEY LEARNED IT.

The authors suggest several general princi-
pies of retrieval that effective instructors
need to know and pass on to their students.
Think of these guidelines as learning strate-
gies applicable for instructors and coaches:

• Even in new fields of knowledge, even
  before you learn how to solve, give the
  problem a try. Making mistakes can be
  valuable. Let your students try to write
  a sonnet before you teach them its intri-
cacies.

• Learning is best achieved by drawing
  on a wide array of your experiences and
  resources rather than simply what you do
  best. If you tend to be a visual learner, try
  the aural approach.

• Space out practice. Rather than one long
  cram period, placing time between prac-
tice sessions allows the brain to consoli-
date or strengthen connections. Try the
three-part approach where practice oc-
curs immediately after new learning has
taken place, immediately before a testing
exercise, and another somewhere in
between.

• Interweaving or practicing two or more
  subjects or skills beats massed practice.
  Amazingly, baseball players will learn to
  hit curve balls better when the pitching
  coach mixes in a few fastballs and
  changeups. Likewise, practicing French
  vocabulary and English grammar in the
  same study session is helpful.

• Vary your time and place of learning.
  Students should study in different places
  and at different times. Mom sending you
to your room every night after supper
  probably wasn’t the best idea.

In Learning to Think Things Through
(2005), Gerry Nosich offers another prin-
ciple of retrieval. Since you tend to forget
most of what you learn, focus not on all
bits of information but on the most funda-
mental and powerful concepts. We once
reduced our entire World Lit course to its
essence with “Art reflects its culture.” As
Make It Stick affirms, “People who learn to
extract key ideas from new material and
organize them into a mental model and
connect them to prior knowledge show an
advantage in learning complex mastery” (6).
In short, if students are taught to retrieve effectively—whether through testing, discussion questions, or papers—they will learn more deeply. And don’t forget to check our sidebar for the two greatest tools of teaching (quizzing) and learning (flashcards).

Rate!

A 2007 study by the Association of American Colleges and Universities claimed the number one skill desired by employers is critical thinking. As critical thinking is essentially the evaluation of argument, meaningful and immediate feedback by instructors, whether written or verbal, models such thinking. As Arum and Rotska demonstrate in Academically Adrift (2011), students learn to evaluate material most effectively by writing the 20-page paper. If you are looking for a way to supplement critical thinking, you might try using Paul and Elder’s The Thinker’s Guide to Critical & Creative Thinking (2005) or any of their writings that explain the Elements of Thought, the Intellectual Standards, and the Intellectual Traits. All information is not equal in value, and students must be equipped to judge its worth. As a simple exercise, regardless of your discipline, find relevant newspaper/online editorials and have your students apply the Paul-Elder or any other critical thinking model to them.

Reflect!

Students must learn to reflect upon what they learned and how they learned it—that is, thinking about the new knowledge and monitoring their learning process (i.e., become metacognitive) and you must stimulate both activities. Instructors can offer in-class and out-of-class assignments that ask daily, end-of-unit, or end-of-semester questions.

Reflective questions often take the form of synthesis questions:

- Does what you just learned in this course remind you of anything you picked up in another course?
- How does this new knowledge differ/conflict with your previous beliefs about the subject?

Metacognitive questions might be:

- What was the most difficult thing to grasp in class today?
- What was the easiest thing to grasp?
- Have you noticed any pattern to the things you consider difficult to learn, easy to learn?

Students can also be encouraged to keep journals or even to “pair-and-share” with other students. To paraphrase a famous saying, unexamined learning is not worth pursuing—and it certainly isn’t deep and lasting.

REFERENCES & RESOURCES


