How Learning Works: Seven Research-Based Principles for Smart Teaching

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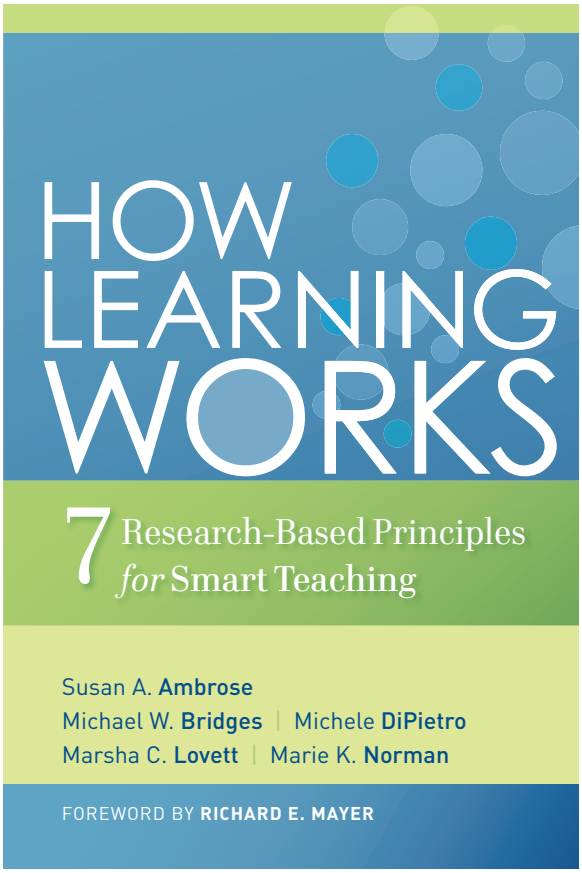

Activity for Principle #3–Motivation

Reflecting on past experiences

Recall a teaching or learning situation (e.g. a course, assignment, etc.that felt highly motivating and compare it to a similar situation (e.g. same discipline, same course) that flopped. List at least 2 - 3 factors which seemed to influence the levels of student motivation. (3 - 5 minutes)

Discuss in pairs and prepare to report:

After quickly reviewing each person's examples, select two factors which were identified by more than one group member and come to an agreement about which aspects of motivation theory might best explain its effects (10 minutes)

Activity for Principles #4-5 (Practice and Feedback toward Mastery)

Create a set of instructions to teach somebody to tie their shoe laces

End of Story (Principle #6–Development and Climate)

Yesterday in my Economics class, we were discussing an article about the cost of illegal immigration to the U.S. economy. The discussion was moving along at a brisk pace when one student, Gloria, began to intervene quite forcefully, saying the reading was biased and didn't represent the situation accurately. Another student, Danielle, responded: "Gloria, why do you always have to bring up race? Why can't we just discuss the figures in the articles without getting so defensive?" A third student, Kayla, who has been pretty quiet up to this point in the semester, said that, as far as she was concerned, illegal immigrants should be arrested and deported, "end of story." Her grandparents were Polish immigrants, she continued, and had come to the U.S. legally, worked hard, and made good lives for themselves, "but now this country is getting sucked dry by Mexican illegals who have no right to be here, and it's just plain wrong." At that point, the rest of the class got really quiet and I could see my three Hispanic students exchange furious, disbelieving looks. Annoyed, Gloria shot back: "Those 'illegals' you're talking about include some people very close to me, and you don't know anything about them." The whole thing erupted in an angry back-and-forth, with Gloria calling Kayla entitled and racist and Kayla looking close to tears. I tried to regain control of the class by asking Gloria to try to depersonalize the discussion and focus on the central economic issues, but when we returned to the discussion I couldn't get anyone to talk. Kayla and Gloria sat silently with their arms folded, looking down, and the rest of the class just looked uncomfortable. I know I didn't handle this situation well, but I really wish my students were mature enough to talk about these issues without getting so emotional.

Professor Leandro Battaglia

From Ambrose, S., Bridges, M., DiPietro, M., Lovett, M., and Norman, M. (2010) *How Learning Works: 7 Principles for Smart Teaching.* San Francisco: Jossey-Bass.

From Morning-Glory to Petersburg (The World Book, 1928)

"Organized knowledge in story and picture"
confronts through dusty glass
an eye grown dubious.
I can recall when knowledge still was pure,
not contradictory, pleasurable
as cutting out a paper doll.
You opened up a book and there it was:
everything just as promised, from
Kurdistan to Mormons, Gum
Arabic to Kumquat, neither more nor less.
Facts could be kept separate
by a convention; that was what
made childhood possible. Now knowledge finds me out;
in all its risible untidiness
it traces me to each address,
dragging in things I never thought about.
I don't invite what facts can be
held at arm's length; a family
of jeering irresponsibles always
comes along gypsy-style
and there you have them all
forever on your hands. It never pays.
If I could still extrapolate
the morning-glory on the gate
from Petersburg in history—but it's too late.

--Adrienne Rich

Table to take notes on the case study “End of Story”

Character	Intellectual development	Social Identity Development
Gloria		
Danielle		
Kayla		
Jason		

How would DeSurra and Church Characterize the climate in this class?			
Explicitly Marginalizing ☐	**Implicitly Marginalizing** ☐	**Implicitly Centralizing** ☐	**Explicitly Centralizing** ☐

What affects the climate in this story?

Two Student Scenarios (Principe #7–Metacognition)

1. The "A" Student

I was exhausted from reading and grading 25 papers over the past weekend, but I was glad to be able to hand them back so quickly. It was the first big assignment in my freshman seminar on immigration, and it required students to state an argument and support it with evidence from course readings and supplemental documents. After class, one of the students, Melanie, approached me and insisted that she needed to talk with me immediately about her grade (not about her paper, mind you!). Hers was a typical first paper in this course—it lacked a clearly articulated argument, and there was only weak evidence to support what I inferred was her argument. As we walked across campus toward my office, she began explaining that she was a "gifted" writer who had always received A's on her high school English papers. She made clear to me that there must be some mistake in this paper's grade because her mother, a high school English teacher, had read the paper over the weekend and thought it was wonderful. Melanie admitted that she had started this assignment the night before it was due, but insisted that she worked best under pressure, saying, "That's just how my creative juices flow."

Professor Sara Yang

2. The Hamster Wheel

After I saw John's grade on the second Modern Chemistry exam, I couldn't help but ask myself, "How can someone attend every single lecture—sitting attentively in the front row—and go to every recitation and lab, no less, and still do so poorly on my exams?" I had explicitly told the students that my exams are designed to test conceptual understanding, and yet John seemed to be thrown for a loop. His first exam score had also been pretty low, but he wasn't alone in that, given students' first-exam jitters. By this time, however, I thought he would have learned what to expect. I asked John what had happened, and he too seemed perplexed. "I studied for weeks," he said, flipping open his textbook. I could hardly believe how much of the text was highlighted. The pages practically glowed with neon yellow. He went on to describe how he had re-read the relevant chapters multiple times and then memorized various terms by writing their definitions on flashcards. I asked where he had learned this approach to studying, and he explained that it had always worked for him when he used to prepare for his science tests in high school.

Professor Gar Zeminsky

From Ambrose, S., Bridges, M., DiPietro, M., Lovett, M., and Norman, M. (2010) *How Learning Works: 7 Principles for Smart Teaching.* San Francisco: Jossey-Bass.

Sample Self-Assessments

How familiar are you with "Karnaugh maps"?

a. I have never heard of them or I have heard of them but don't know what they are.

b. I have some idea of what they are but don't know when or how to use them.

c. I have a clear idea of what they are but haven't used them.

d. I can explain what they are and what they do, and I have used them.

Have you designed or built a digital logic circuit?

a. I have neither designed nor built one.

b. I have designed one but have never built one.

c. I have built one but have not designed one.

d. I have both designed and built a digital logic circuit.

How familiar are you with a "t-test"?

4. I have never heard of it.

5. I have heard of it but don't remember what it is.

6. I have some idea of what it is, but am not too clear.

7. I know what it is and could explain what it's for.

8. I know what it is and when to use it and could use it to analyze data.

How familiar are you with Photoshop?

a. I have never used it, or I have tried it but couldn't really do anything with it.

b. I can do simple edits using preset options to manipulate single images (e.g., standard color, orientation, and size manipulations).

c. I can manipulate multiple images using preset editing features to create desired effects.

d. I can easily use precision editing tools to manipulate multiple images for professional quality output.

For each of the following Shakespearean plays, place a check mark in the cells that describe your experience.

Play	Have seen a TV or movie production	Have seen a live performance	Have read it	Have written a college-level paper on it
Hamlet				
King Lear				
Henry IV				
Othello				

From Ambrose, S., Bridges, M., DiPietro, M., Lovett, M., and Norman, M. (2010) *How Learning Works: 7 Principles for Smart Teaching.* Appendix A, pp.225-7. San Francisco: Jossey-Bass.

Sample Exam Wrapper

Physics Post-Exam Reflection Name: _____

This activity is designed to give you a chance to reflect on your exam performance and, more important, on the effectiveness of your exam preparation. Please answer the questions sincerely. Your responses will be collected to inform the instructional team regarding students' experiences surrounding this exam and how we can best support your learning. We will hand back your completed sheet in advance of the next exam to inform and guide your preparation for that exam.

1. Approximately how much time did you spend preparing for this exam?
   _____

2. What percentage of your test-preparation time was spent in each of these activities?

   a. Reading textbook section(s) for the first time _____
   b. Rereading textbook section(s) _____
   c. Reviewing homework solutions _____
   d. Solving problems for practice _____
   e. Reviewing your own notes _____
   f. Reviewing materials from course website _____
      (What materials? _____)
   g. Other _____
      (Please specify: _____)

3. Now that you have looked over your graded exam, estimate the percentage of points you lost due to each of the following (make sure the percentages add up to 100):

   a. Trouble with vectors and vector notation _____
   b. Algebra or arithmetic errors _____
   c. Lack of understanding of the concept _____
   d. Not knowing how to approach the problem _____
   e. Careless mistakes _____
   f. Other _____
      (Please specify: _____)

4. Based on your responses to the questions above, name at least three

things you plan to do differently in preparing for the next exam. For instance, will you just spend more time studying, change a specific study habit or try a new one (if so, name it), make math more automatic so it does not get in the way of physics, try to sharpen some other skill (if so, name it), solve more practice problems, or something else?

5. What can we do to help support your learning and your preparation for the next exam?

From Ambrose, S., Bridges, M., DiPietro, M., Lovett, M., and Norman, M. (2010) *How Learning Works: 7 Principles for Smart Teaching.* Appendix F, pp.251-4. San Francisco: Jossey-Bass.

Task: Create a process to foster metacognitive skills in your students for a course you will teach

Address the metacognitive cycle in relation to this task:

1. Assess the task – what's involved? How does this unpack?

2. Evaluate strengths and weaknesses – where do you feel confident you can really help students? where are you at a loss or might you need help?

3. Plan – jot down a plan through the semester

4. Troubleshoot- What might go wrong? How can you anticipate problems and plan for them?