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Center for the Advancement of Teaching

Foundations of Good Teaching: A brief guide to *How Learning Works: 7 Research-Based Principles for Smart Teaching*

What is learning?

Learning is a *process*, not a product; but because this process takes place in the mind, we can only infer that it has occurred from students' products or performances.

Learning involves *change* in knowledge, beliefs, behaviors, or attitudes. This change unfolds over time; it is not fleeting, but has a lasting impact on how students think and act.

Learning is not something done *to* students, but rather something students themselves *do*. It is the direct result of how students interpret and respond to their experiences.

1. *Learning must be built on **prior knowledge.***

Learning is a process of "interpreting incoming information and… perceptions through the lens of…existing knowledge, beliefs, and assumptions." If we want students to learn, we must ensure that they connect what they learn to what they already know. To help students make the right connections, we must begin by finding out what prior knowledge they bring to our classes so that we can help them build on it effectively; however, if their knowledge is incomplete or inaccurate, it can hinder learning instead of help it, so it is important for us to root out misconceptions and correct them.

To address prior knowledge, try:

- Identifying prior knowledge you expect students to have;
- Administering a diagnostic assessment;
- Looking for patterns of error in student work.

2. *Expert and novice learners differ primarily in how they **organize knowledge**.*

Experts have far denser knowledge structures than do novice learners. This enables us to make more and more flexible connections amongst new and existing knowledge, and to learn more efficiently. Novice learners' working memories are more quickly overtaxed, because they do not perceive patterns: we can facilitate their learning by

introducing concepts and big-picture patterns rather than relying on masses of factual information.

To help students organize knowledge more effectively, try:

- Using contrasting examples or cases to highlight the organizing features;
- Making the connections among concepts explicit (or asking students to identify them);
- Asking students to draw concept maps to reveal their knowledge structures.

*3. Students' **motivation** determines, directs, and sustains what they do to learn.*

Contrary to our usual assumptions, motivation is not a quality intrinsic to an individual student, but a state that we can readily influence. We can design motivating learning experiences if we address the following factors:

- Transparency: Students need a clear sense of goals and expectations.
- Perception of value: Students must recognize the purpose and value of the learning experience.
- Self-efficacy: Students must have faith in their ability to learn.
- Supportive environment: Students must perceive that they are expected to succeed.

To nourish student motivation, try:

- Providing authentic, real-world tasks;
- Showing your own passion and enthusiasm for the discipline;
- Providing early opportunities for success;
- Providing rubrics, to make expectations explicit;
- Helping students to see errors as opportunities for growth.

*4. **Mastery** is complex, and takes both time and practice.*

It is often difficult for experts to recognize the complexity of tasks that have come to seem automatic. This means that it can be challenging for us to "unbundle" all the component skills (often complex thinking processes) that students must master in order to attain the goals we set for them. We are often unaware of the "cognitive load" we are imposing, which hampers learning by dividing their attention amongst too many new tasks. It is important for us, as the experts, to prioritize, determining which concepts and skills are most important and designing assignments that allow students to focus their practice.

To help students develop mastery and learn for transfer, try:

- Identifying (so you can push past) your own "expert blind spots";
- Providing isolated practice of weaker or missing skills;
- Giving students opportunities to apply concepts in diverse contexts;
- Asking them to generalize to larger principles.

5. *Goal-directed **practice** coupled with targeted **feedback** enhances the quality of students' learning.*

The three most important factors in designing an effective learning experience are clear ***goals***, adequate opportunities to ***practice,*** and ***feedback*** at the right times. In other words, students must begin with a clear sense of what they need to achieve. Although we may have heard that practice makes perfect, in fact, practice makes permanent, so it is our responsibility as experts to determine what practice students need. We must also provide feedback that is targeted to the skill we have asked them to practice and that is timed to allow them to improve.

To provide *goal-directed* practice, try:

- Using a rubric to specify and communicate criteria for student performance;
- Giving examples or models of target performance;
- Showing students what you do not want.

To better target your feedback, try:

- Giving feedback only on the skills you want to prioritize;
- Providing real-time feedback at the group level;
- Incorporating directed peer feedback.

6. *Students' current level of **development** interacts with the social, emotional, and intellectual climate of the course to shape learning.*

A safe and welcoming classroom climate is a precondition for learning. Learning is a social activity, and students are still developing intellectually, psychologically, and morally, and the things we ask them to learn can assist that development. It is important that we create learning environments where there is room for errors and exploration, where we "resist a single right answer," and where we "model inclusive language, behavior, and attitudes."

To cultivate a productive environment, try:

- Making uncertainty safe;
- Reducing anonymity;
- Encouraging (and, of course, modeling) respectful communication;
- Using multiple and diverse examples.

7. *To become **self-directed** learners, students must learn to monitor and adjust their approaches to learning.*

Most undergraduates are not yet self-directed learners, so it is our responsibility to carefully design the practice and feedback they receive; however, we want them to graduate as self-directed and life-long learners. A self-directed learner can assess a task, monitor her own preparation and performance, and use reflection to develop new strategies for improving. To help students develop these kinds of metacognitive habits, we must design activities that encourage them to pay attention to their own learning. We must also teach them that their intelligence is not fixed, that by grappling with challenges, they can grow their abilities.

To encourage metacognition, try:

- Being more explicit than you think necessary;
- Requiring students to reflect on and annotate their own work;
- Prompting students to evaluate the effectiveness of their own study skills.

Ambrose, et al., *How Learning Works: 7 Research-Based Principles for Smart Teaching.* San-Francisco: John Wiley and Sons, 2010.

If you'd like to take a look at the entire book, which is filled with great concrete examples, it's available as an e-book from the FIU library—or feel free to drop by and borrow a copy from us at CAT in PC 237.

We look forward to working with you!