

PEER-LED TEAM LEARNING LEADER TRAINING

USING THE PLTL ENVIRONMENT TO PROMOTE SELF- REGULATION

MARK S. CRACOLICE

Some things that students learn in coursework are new knowledge. If an oxyacid has one fewer oxygen than the compound named with an *-ic* ending, the suffix is changed to *-ous* when naming the acid. Humans are in the order *Primates*, the family *Hominidae*, the genus *Homo*, and the species *sapiens*.

Other things learned are modifications of existing knowledge. Even though you perceive the earth as flat, you acquire knowledge through formal instruction to learn that it is round. You think that energy and force are the same, but you learn that they are not. Your senses tell you that a metal object is cooler than a wooden object, but in school, you learn that they are at the same temperature.

We therefore must wear two hats as instructors. One is worn while teaching new facts. The other hat is worn while changing people's minds. In this article, we focus on how to use Peer-Led Team Learning as a curriculum strategy that can help to change our students' minds.

Self-Regulation

The process through which an individual changes his or her mind is known as self-regulation. It is a process by which one compares current thinking patterns with information obtained from new experiences. If the new information is consistent with established mental understandings, no change in thinking is needed. When the new data conflicts with what is already known, individuals may change their mind, and if they do, learning occurs.

Our observations are indicating that a key difference between students who are successful in school and those who are not is the ability and/or desire to self-regulate. Students who self-regulate will consistently recognize when their current thinking patterns are not appropriate when given a source of new information, and then they work to modify their thinking to be consistent with the new data. In essence, meaningful learning occurs whenever good students are presented with an opportunity to learn.

Poor students generally choose to ignore the discrepancy between what they presently think, and new, conflicting information. Instead of changing their thinking patterns, they will force new data into the wrong mental concept, ignore new data, or create a temporary new "this is how I'm supposed to answer a question in school" thinking pattern. This is not necessarily a conscious choice. In many cases, years of lack of practice in meaningful learning, copious reinforcement of "memorize and regurgitate equals success in school," and a social environment that discourages curiosity about learning leads to degradation of the internal driving force to self-regulate.

A key component in the definition of self-regulation is the word *self*. Meaningful learning is an internal process. First, individuals must pay attention to the new information presented. Second, they must compare that new information to how they presently think and recognize the conflict. Third, they must modify their thinking and test their new mental construct against additional data. All parts of this process must be done by each individual; a teacher cannot do it for another person. Our job as instructors is to provide the opportunity for students to self-regulate.

The Peer-Led Team Learning Environment

The well-known psychologist Jean Piaget proposed that there are three factors that influence self-regulation: maturation, experience, and social transmission. Current evidence indicates that short-term memory capacity increases with age until it reaches its maximum of about seven bits somewhere in the mid-teen years. College instructors need not be concerned with maturation, but elementary and secondary school instructors need to be cognizant of the natural limitation of children's memories when constructing their curricula.

The role of experience is intuitively obvious. The more one interacts with the environment, the greater the opportunity to learn from those interactions. Interaction alone, of course, is necessary but not sufficient. Experience with the materials in our disciplines is the essence of why we consider laboratory to be an essential component of science coursework.

The focus of the remainder of this article is on the essential role of social transmission in the self-regulation process, and on how Peer-Led Team Learning provides an environment for this type of interaction that is not part of the traditional course structure. In order for people to change their minds, they must be exposed to conflicting information and alternate explanations for that information. Social interaction provides an environment where ideas can be debated, discussed, and argued. An individual's current way of thinking must be self-examined before it can be changed. It is interaction with peers and with teachers that leads to discussion and to meaningful learning.

Unfortunately, we believe that the ability to self-regulate is often impeded in many college students. We believe that, through the Peer-Led Team Learning environment, students with a hindered ability to self-regulate can be stimulated to rebuild this ability with help from a leader and other peers who have this ability. Thus, a critical issue that needs to be included in leader training is the introduction of the idea of self-regulation and methods to help other students refine this ability.

Specifically, we recommend the following, much of which is already in place in many training programs.

1. Make leaders aware of the cyclical process of self-regulation and its importance in promoting student success.
2. Before students solve a PLTL Workshop problem, ask them what they already know about solving similar problems.
3. Develop materials with questions that partially rely on older concepts, which then stretch into new concepts. Emphasize the connections between what is already known and what is to be learned.

4. Do not rush students toward “the right answer.” Encourage them to verbalize their thinking and ask questions about the thinking process itself. Have students write out their incorrect attempts at problem-solving as well as their correct attempts and share both with others.
5. Require all students to explicitly write out the entire problem-solving process. This should include identification of given information, the source of needed “hidden” information (values of constants, etc.), the units of the desired answer (when appropriate), and a diagram of the pathway toward the solution.
6. When the correct solution pathway(s) is/are arrived upon and verified by the group, ask students to reflect upon what they learned from solving the problem. Require them to explicitly write down a list of how their thinking changed.
7. Have students speculate on how exam problems similar to the one they just solved could be constructed.
8. Ask students how the concept under discussion relates to other concepts in the course. Have them diagram the relationships.

A curriculum design that includes Peer-Led Team Learning provides an opportunity for meaningful learning to occur that cannot be accomplished with the traditional lecture and lab format. Although we tend to focus on teaching the content of our disciplines, we must keep in mind the need to rekindle the desire to learn in many students, and we must help these students learn how to be good students. In doing so, we provide them with the opportunity to continue to learn in future coursework and the potential to refine their higher-order thinking skills.

Mark S. Cracolice
The University of Montana

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