The Thinking about Thinking to Promote Thinking

We all want our future practitioners and researchers to have the appropriate thinking skills: creative, practical and critical. From research we know to promote critical thinking we must provide step-by-step guided practice, authentic problem solving (i.e., problem solving directly related to tasks encountered in practice), structured collaboration, focused communication and formative feedback (i.e., process between instructor and student to enhance, recognize and respond to the learning).

Experiential training (i.e., training that infuses direct experience with the learning environment and content) is well suited for developing these thinking skills because it is an authentic environment, much more so than a classroom. Inherent in experiential training are many of the aspects that promote critical thinking but traditional classroom courses can lack many of these practices.

Regardless of setting, the one area that we may overlook, however, is metacognition or the thinking about thinking.

Metacognition

There are three skills used in metacognition: **planning**, **monitoring**, and **evaluating**.

Planning involves setting goals, deciding how much time it takes to complete a task, what strategies will be used in the task, how to start, what resources are needed and what to give attention to.

Monitoring involves asking oneself, does this make sense or am I going to fast through this task?

Evaluating involves making judgments about the learning process and outcomes (i.e., reflection), asking questions such as should I change strategies, should I get help, or am I done with the task?

Let's look at a bad example of metacognition from a student perspective, preparing a journal club:

In this scenario the student waits to the last minute and does not know where to look for articles; this is bad planning.

The student then emphasizes non-essential details in the article; this is bad monitoring.

Finally, they do not spell check, check grammar or does not re-read the assignment to see if they achieved the goal of the assignment; this is bad evaluating.
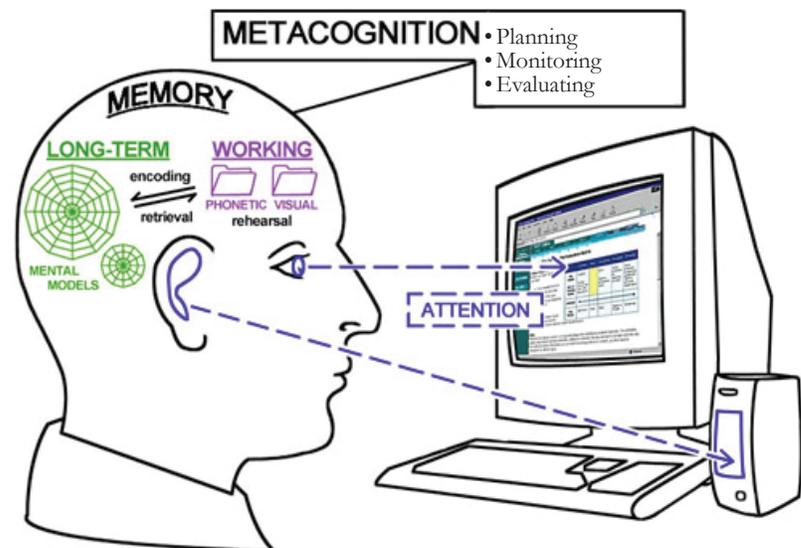
As experts, instructors/preceptors tend to overlook their own thoughts about completing tasks or solving a problem so it is key to make ones thinking explicitly known to the learner. As instructors/preceptors we can be a metacognitive guide by providing structured learning environments and support, guide and assist students. Research has found asking students' simple questions such as: "what did you learn about yourself today" or "what did you learn that you can do again and again" improves metacognitive skills.

So what can we do:

1) Help focus attention and set learning goals;

2) Ask prompting questions to activate prior knowledge (e.g., what do you already know that is related to this content? Do not ask simple yes or no type questions but answers that require a full response);

If students lack the relevant prior knowledge have them analyze distinctions between cases. One advantage about learning differences is that we tend to focus more on differences between concepts than similarity between concepts.;

METACOGNITION
• Planning
• Monitoring
• Evaluating

MEMORY

LONG-TERM   WORKING

encoding   PHONETIC VISUAL
retrieval   rehearsal

MENTAL MODELS

ATTENTION

Timeout for Teaching newsletter

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Important Dates
Aug 23: Fall semester starts
Oct 3: Course proposals due to Curriculum Committee

3) Encourage the use of who, what, where, when, why after reading;

4) Help students anticipate difficult areas and errors;

5) Help students learn strategies for retaining information such as how to chunk information, connect ideas, organize thoughts, and elaborate on concepts;

6) Think out loud so students see how you process information. Expert thinking is often internal which can negatively reinforce right/wrong thinking by the students;

7) Regulate difficulty by breaking down problems into simpler steps. After practice, increase complexity of the problem. Alternatively provide half-done examples and have students work out conclusions;

8) Prepare activities that help students test their ability to recognize patterns; compare their own performance to the expert model; demonstrate parts of a skill or steps of process as well as the whole; and offer grading tools in advance (e.g., checklists, rating scales, rubrics;

9) Give students complete notes. In this case the focus should shift from highlighting or memorizing everything to how to use notes. This can include:

a. Skimming notes to familiarize students with major topic areas;

b. Translating, connecting, elaborating, or organizing information to help students process and learn;

c. Summarizing the information by writing a topic sentence for each section; identifying big ideas that cover several points; finding supporting information for each big idea; identifying and deleting unnecessary details; and contrasting relevant and irrelevant.

Instructors who do not understand how thinking skills develop may overestimate student skills and assign unreasonably complex coursework. Without adequate support, students become overwhelmed, perform poorly and will resist further efforts.

Metacognition focuses on the thinking about thinking. Critical thinking is developed through modeling of the behavior thus it becomes very important to explain the thought process to the learner. The process requires scaffolding (i.e., building complexity with time) and distributed practice (e.g., practice over time). This is not a one and done deal and needs to be built in all courses and experiences throughout the curriculum.

For more information:
- Amborse et al., How Learning Works, 2010
- Gauci et al., Adv Physiol Educ., 2009
- Sprague et al., Journal of Marketing Education, 2011

Use of Clickers as a Metacognitive Tool

Here are findings from the literature on the use of audience response systems to help students develop their metacognitive skills.

- Mid- and end-semester examination results correlated with participation rates in clicker voting. Student felt "more engaged", "intellectually stimulated", and "motivated to think". The majority of students thought "carefully and seriously" about the questions posed (Gauci, Dantas, Williams, Kemm, 2007).

- Students who were less likely to participate in an unstructured discussion were more comfortable defending their answer choice. By having committed to an answer, the students tended to be more engaged in the discussion of the question and will continue to work out an answer if they are required to input it into the clicker (Sprague & Dahl, 2010).

Faculty Reflections: The Lilly Conference

In 2010/11 the Center for Educational Excellence in Pharmacy supported travel by faculty, students and residents to various teaching venues. In February 2011 the Center supported five faculty to attend the Lilly Conference on College Teaching in Greensboro, NC. Below are some excerpts of what the faculty learned at this meeting

"Teaching with social intelligence involves synchrony, self-presentation, influence, and concern. Synchrony is, at its most basic, acting smoothly at the nonverbal level. The concept behind synchrony is that we respond to and often act as a mirror of other individuals; in the classroom, this translates to higher evaluations the more students mimic teacher tone, phrasing, and style. The tone of a classroom is set by the teacher, so if a class is not going well one must practice intense awareness in order to be able to react to social cues without conscious thought."

"Teaching Metacognition was by far my favorite session. In essence, teaching metacognition is teaching students to realize when they are learning so that they recognize the process and are therefore more likely to repeat it. Recognition of instances when 'the lightbulb goes on' and consciously evaluating the process that led to those instances may help pharmacy students to learn better not just while in school but when in practice as well."

"One statement that stood out to me was: *The worst active learning strategies are by far better than our best lectures.* Wow!...I attended a session on how to engage and motivate students, and learned creative strategies to get students involved in class discussions. One of the professors motivates students to participate by giving them quarters each time they attempt to answer a question. After spending about $2.00, she has the whole class involved."