I Think, Therefore I Learn
Using Active Learning to Enhance Metacognitive Skills

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Center for the Advancement of Teaching and Faculty Development

For 'the development of faculty across all career stages and areas of professional responsibility'

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Your Mission, if you choose to accept it, is . . .

to think about what brought you here on a Wednesday afternoon to discuss metacognition and active learning.

Consider the following truths . . .

- Learning is a process (not a product)
- It is a process that we cannot directly observe, so we must infer its occurrence from the products (or outcomes) it produces
- The outcomes do not necessarily correlate to the effectiveness of the process.

Consider the following truths . . .

- Our roles as educators is to not only convey information (teach), but to impart to students how to effectively use that information to learn (change their knowledge, beliefs, behaviors and attitudes).
- It is not intuitive to students how to engage in the process of learning.

Goals for this Session

1. Define **metacognition** and discuss why it is critical in student learning.

2. Present the case for **active learning** as a way to enhance metacognitive skills.

3. Present some **examples** of effective strategies and assignments.

4. Introduce some **resources** to help promote metacognition and active learning.

Metacognition: What is it?

- The ability to:
  - think about one's own thinking
  - know about one's own level of knowledge
  - understand one's own level of understanding

Why don't students know how to *learn*?

- They were never taught how.
- To learn, students must . . .
  - acquire knowledge.
  - acquire metacognitive skills.
  - practice using and applying those skills and knowledge.
  - learn when and how to apply the appropriate skills and knowledge.

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

Poor Metacognative Skills

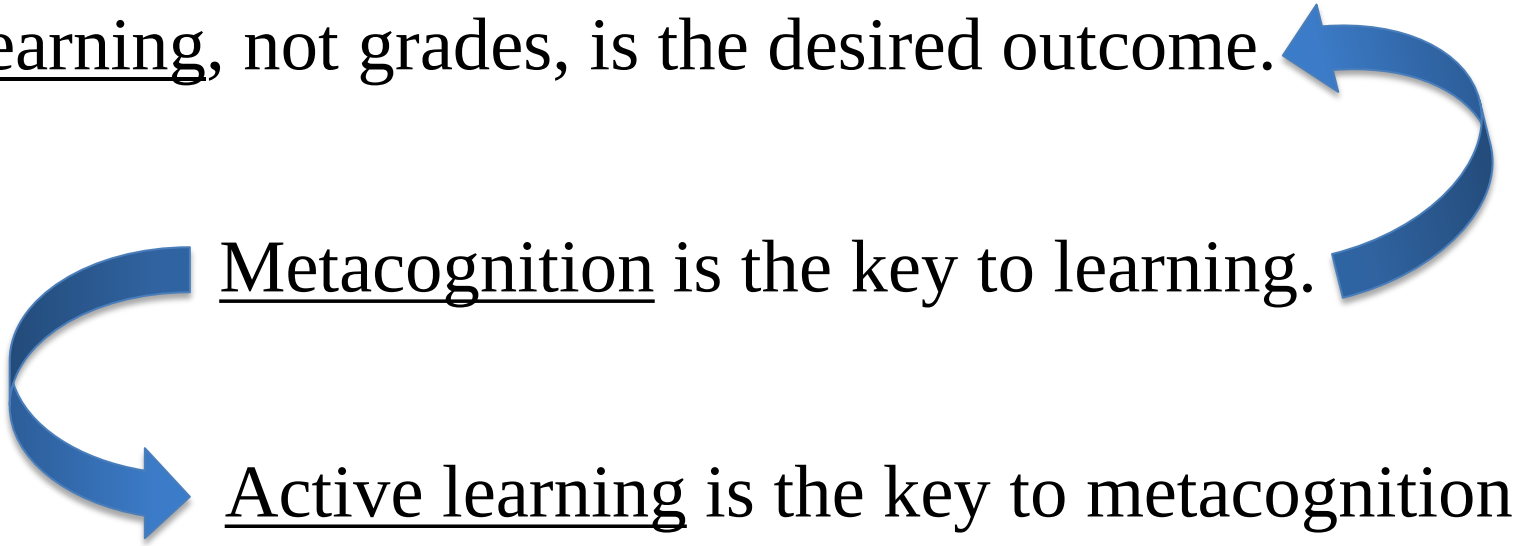
- What does this *look like* in our classrooms?
  - Students who:
    - stop studying prematurely.
    - don't ask questions in advance because they think they understand everything perfectly.
    - don't need to take or review notes.
    - don't need to practice or study without notes.
    - are sure they did well.
    - are shocked when they didn't.

What we know about learning that students don't

Learning, not grades, is the desired outcome.

Metacognition is the key to learning.

Active learning is the key to metacognition.



Teachers Must Help Students Bridge the Gap

Current Behavior ⟶ Current Grades

Productive Behavior ⟶ Desired Grades

What is Active Learning?

- A method of instruction in which the learner is responsible for her own learning
- Students engage in activities (e.g., reading, writing, discussion, and problem solving) that promote analysis, synthesis and evaluation of content (higher-order thinking).
- Emphasis on students' explorations of their own attitudes, values, and prior experience
- Students are involved in more than listening
- Students are active participants in the process

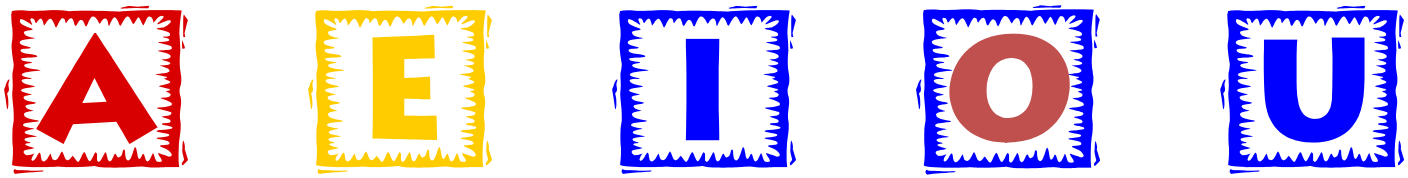
Based on Bonwell, C.; Eison, J. (1991). Active Learning: Creating Excitement in the Classroom AEHE-ERIC Higher Education Report No. 1.

Why Incorporate Active Learning?

- Reinforces important material, concepts, and skills
- Provides more frequent and immediate feedback to students
- Serves as formative assessment
- Creates personal connections to the material for students, which increases their motivation to learn
- Creates a sense of community in the classroom through increased student-student and instructor-student interaction
- **Enhances *metacognitive skills***

http://www.cte.cornell.edu/teaching-ideas/engaging-students/active-learning.html

Counting Vowels in 45 Seconds



How accurate are you?

Count the vowels
in the words on the next slide.

Adopted from a workshop by Saudra Y. McGuire, Ph.D.

Dollar Bill
Dice
Tricycle
Four-leaf Clover
Hand
Six-Pack
Seven-Up
Octopus

Cat Lives
Bowling Pins
Football Team
Dozen Eggs
Unlucky Friday
Valentine's Day
Quarter Hour

Adopted from a workshop by Saudra Y. McGuire, Ph.D.

How many items on the list do you remember?

1. 0 - 1
2. 2 – 5
3. 6 – 8
4. 9 – 11
5. 12 – 14
6. 15

Adopted from a workshop by Saudra Y. McGuire, Ph.D.

Let’s look at the words again…

How they arranged?

Adopted from a workshop by Saudra Y. McGuire, Ph.D.

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NOW how many items on the list do you remember?

1. 0 - 1
2. 2 – 5
3. 6 – 8
4. 9 – 11
5. 12 – 14
6. 15

Adopted from a workshop by Saudra Y. McGuire, Ph.D.

What were the two major differences between the 1st and 2nd attempts?

1. We knew what the task was.
2. We knew how the information was organized.

Adopted from a workshop by Saudra Y. McGuire, Ph.D.

What metacongnitive skill was at play in this activity?

Knowledge organization

(how information is arranged and connected in an individual's mind)

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

From the Theoretical to the Practical . . .

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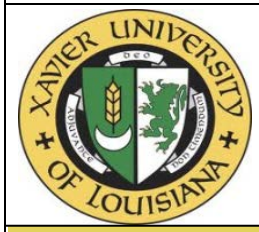

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Low Prep, In-Class Active Learning Activities

Angelo, T. A. and K. P. Cross (1993). *Classroom Assessment Techniques: A Handbook for College Teachers*, (2nd edition. San Francisco: Jossey-Bass Publishers.

Think-Pair-Share

- Give students a prompt, allow them to think/write, pair up and exchange ideas with a partner
  - Gives students time needed to process information
  - Allows for collaborative learning
- *Example: Describe an experiment and conclusions reached based on the experiment. Then ask them to reflect on then pair up on the following.*
  - *Do the experimental results support the conclusions reached?*
  - *Explain why or why not?*
- What can we do to emphasize metacognition here?

Tell Your Partner

- Instructors give students course concepts to define or describe for each other in their own words.
  - Takes a deeper understanding of information to be able to put it in their own words
  - Allows for collaborative learning
- *Example, partner on the left, describe the sympathetic nervous system. Partner on the right, define the parasympathetic nervous system.*
- What can we do to emphasize metacognition here?

Directed Paraphrasing

- Students paraphrase concepts for a specific audience
  - Takes a deeper understanding of information to be able to put it in their own words
  - Can be collaborative learning
- *Example: Ask students to explain the difference between the first-, second- and third-person point of view to:*
  - *your seven year old cousin, your grandmother*
- What can we do to emphasize metacognition here?

Explain hypothesis to pastor

✓ nice

04/05/11

Hey Rev. Payne

I'm doing a research at my school and its been very interesting. I was trying to see if there would be a positive relationship b/t alcohol consumption, sensation seeking and risky sexual behavior among college students. This interested me b/c I know for a fact that it's a problem in our society. I mean I don't know from my own personal experiences but I know people. I did the study and it showed that there was a positive relationship b/t the 3 variables. Meaning ~~that~~ that they each influence each other.

Directed Paraphrasing

- Let's try it!
- Pair up.
- Person on the right:
  - Explain the concept metacognition to a 6-year old.
- Person on the left:
  - Explain the concept metacognition to your Dean.
- What happened to your thinking with the two different audiences?

Application Cards

- Students generate real-world applications for principles, theories, or concepts they have just learned
  - Forces students to apply material in a different context, deeper encoding
- *Example: I ask students to write down one real-life application for what they just learned about different types of DNA mutations*
  - *Even better, have them find an example on a news website*
- What can we do to emphasize metacognition here?

Background Knowledge Probe

- Short, simple surveys for use at the the start of new material
  - Allows for deeper learning as student connection material with what they already know
  - Clears up misconceptions
- *Example: Why do we have different seasons (i.e., winter, spring, summer, fall)?*
- What can we do to emphasize metacognition here?

Word Journal

- First students summarize a lesson in one word. Second, the student writes a brief paragraph explaining the choice of that word.
  - Encourages students to understand the main point and organizational structure of material
- *Example: We just covered photosynthesis. Pick one word that summarizes this process in its entirety. Explain.*
- What can we do to emphasize metacognition here?

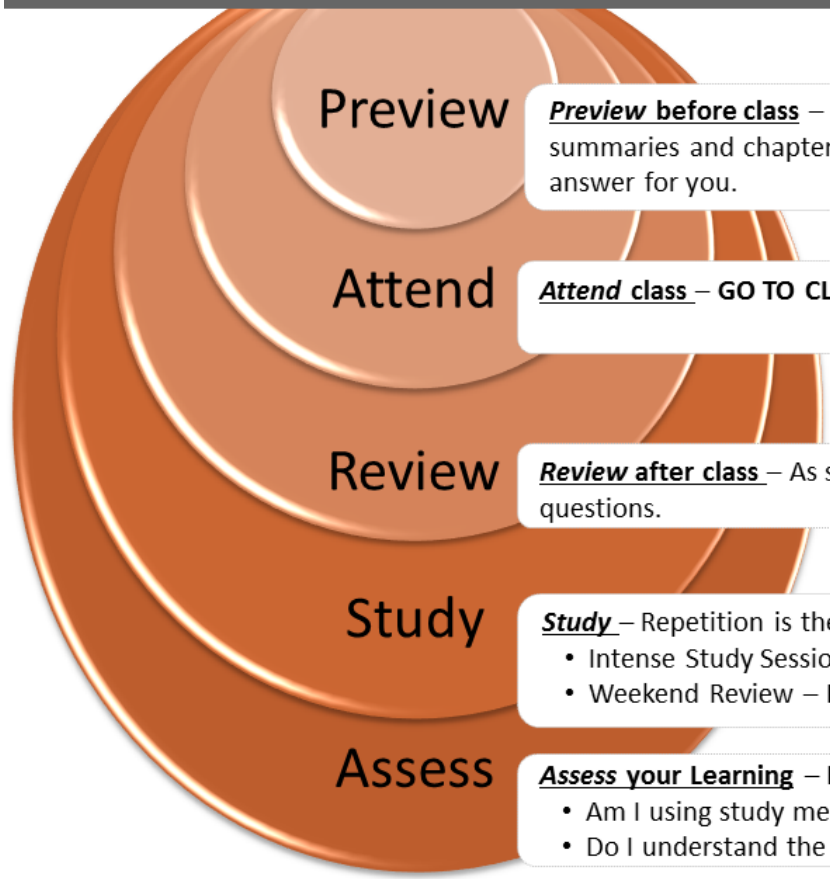
Word Journal

- Let's try it!
- Think of one word you'd use to describe the content of this presentation so far.
- Share it with your partner and explain why you picked that word.
- What did you notice about your own metacognition here?
- Bonus: We did this in a think pair share format.

Other Effective Metacognitive Strategies

- Encourage students to:
  - Always ask why, how, and what if
  - Use SQ5R for reading assignments
    - (survey, question, read, recite, review, wRite, reflect)
  - Test understanding by preparing “mini lectures” on concepts
  - Always solve problems without looking at an example or the solution
  - Use the Study Cycle with Intense Study Sessions

The Study Cycle



***Preview* before class** – Skim the chapter, note headings and boldface words, review summaries and chapter objectives, and come up with questions you'd like the lecture to answer for you.

***Attend* class** – **GO TO CLASS!** Answer and ask questions and take meaningful notes.

***Review* after class** – As soon after class as possible, read notes, fill in gaps and note any questions.

Study – Repetition is the key. Ask questions such as 'why', 'how', and 'what if'.
- Intense Study Sessions* - 3-5 short study sessions per day
- Weekend Review – Read notes and material from the week to make connections

***Assess* your Learning** – Periodically perform reality checks
- Am I using study methods that are effective?
- Do I understand the material enough to teach it to others?

Intense Study Sessions

1	**Set a Goal**	1-2 min	**Decide what you want to accomplish in your study session**
2	**Study with Focus**	30-50 min	**Interact with material**- organize, concept map, summarize, process, re-read, fill-in notes, reflect, etc.
3	**Reward Yourself**	10-15 min	**Take a break**– call a friend, play a short game, get a snack
4	**Review**	5 min	**Go over what you just studied**

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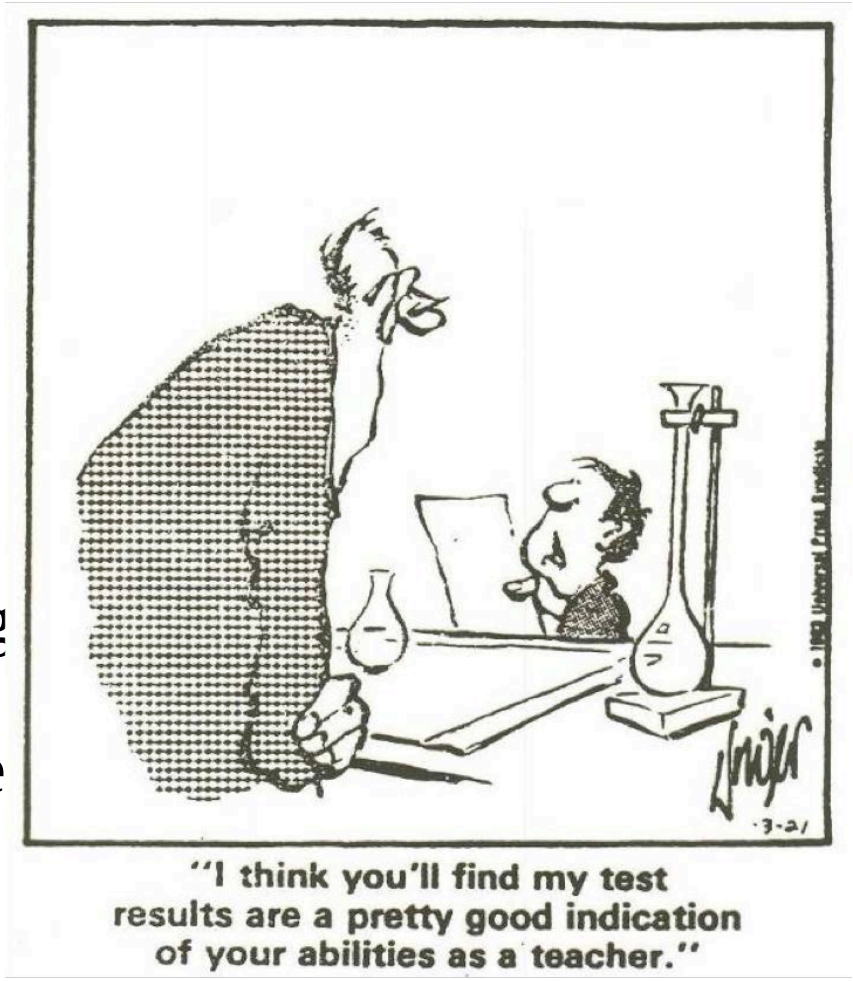
Source: Saundra Y. McGuire, Ph.D. in *Teach Students How to Learn: Metacognition is the*

Take-Home Points

- Metacognitive skills are important in learning.
- Students need to *learn* these skills.
- We can teach these skills and our content simultaneously.
- We can do this by creating assignments (both in and out of class) that reinforce these skills.



"I think you'll find my test results are a pretty good indication of your abilities as a teacher."

References and Resources

- Improve with Metacognition
  - http://www.improvewithmetacognition.com/
- Thinking about One's Thinking
  - http://cft.vanderbilt.edu/guides-sub-pages/metacognition/
- How to Get the Most Out of Studying (Video Series)
  - http://www.samford.edu/how-to-study/

References and Resources

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