



ASEE Best Practices – 3/24/11

Making the Transition to Active Learning

from

“Engineering an Engineering Education”

3-day Workshop

Bucknell University – July 2009



Defining Active Learning

- Any instructional method that actively engages students in the learning process.
- Requires students to do meaningful learning activities that promote intellectual engagement.





Lecturing

Education is what happens to the other person,
not what comes out of the mouth of the
educator.

- (*Myles Horton*)



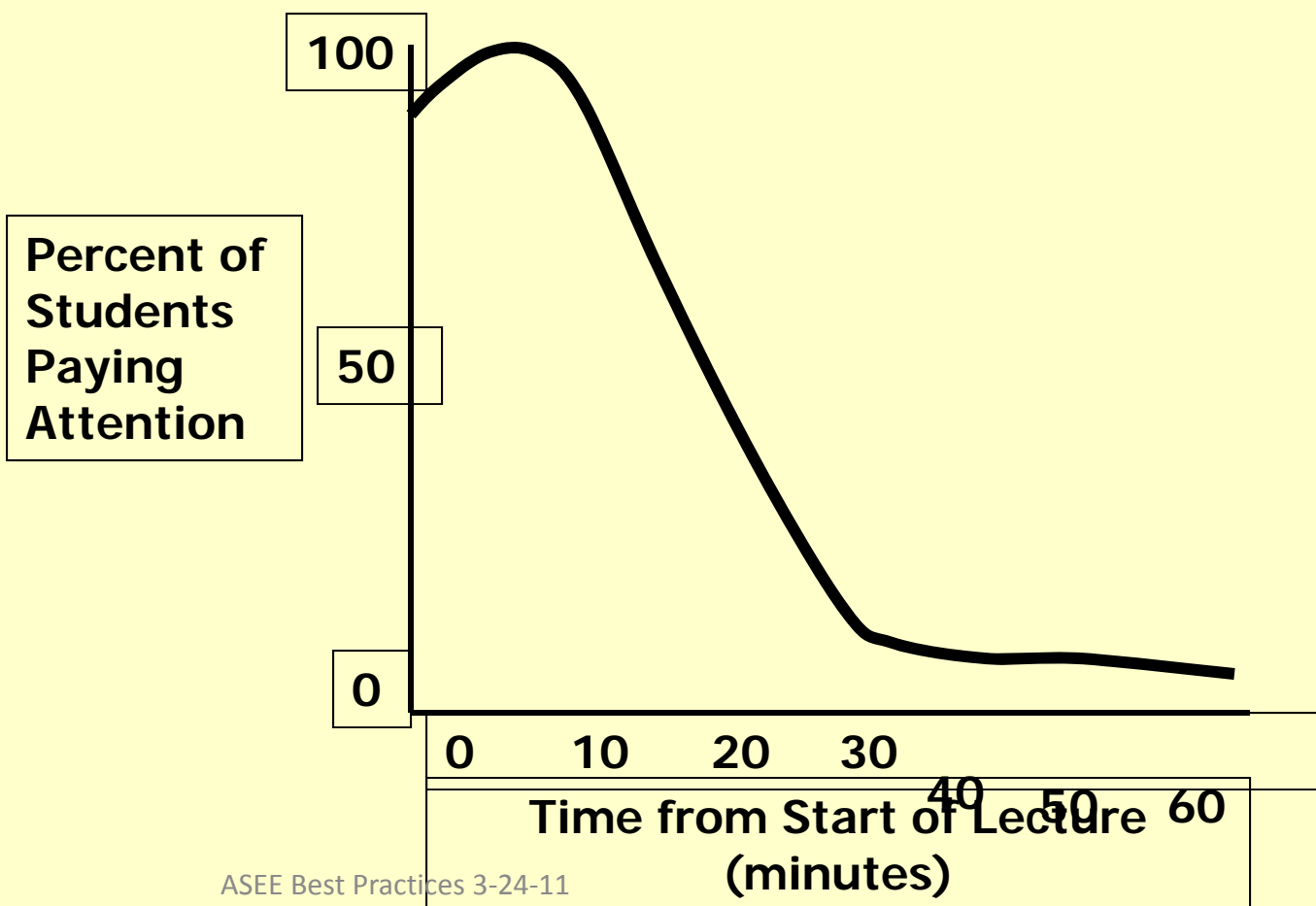
"NO YOU CAN'T ASK A QUESTION."



What does the data say?

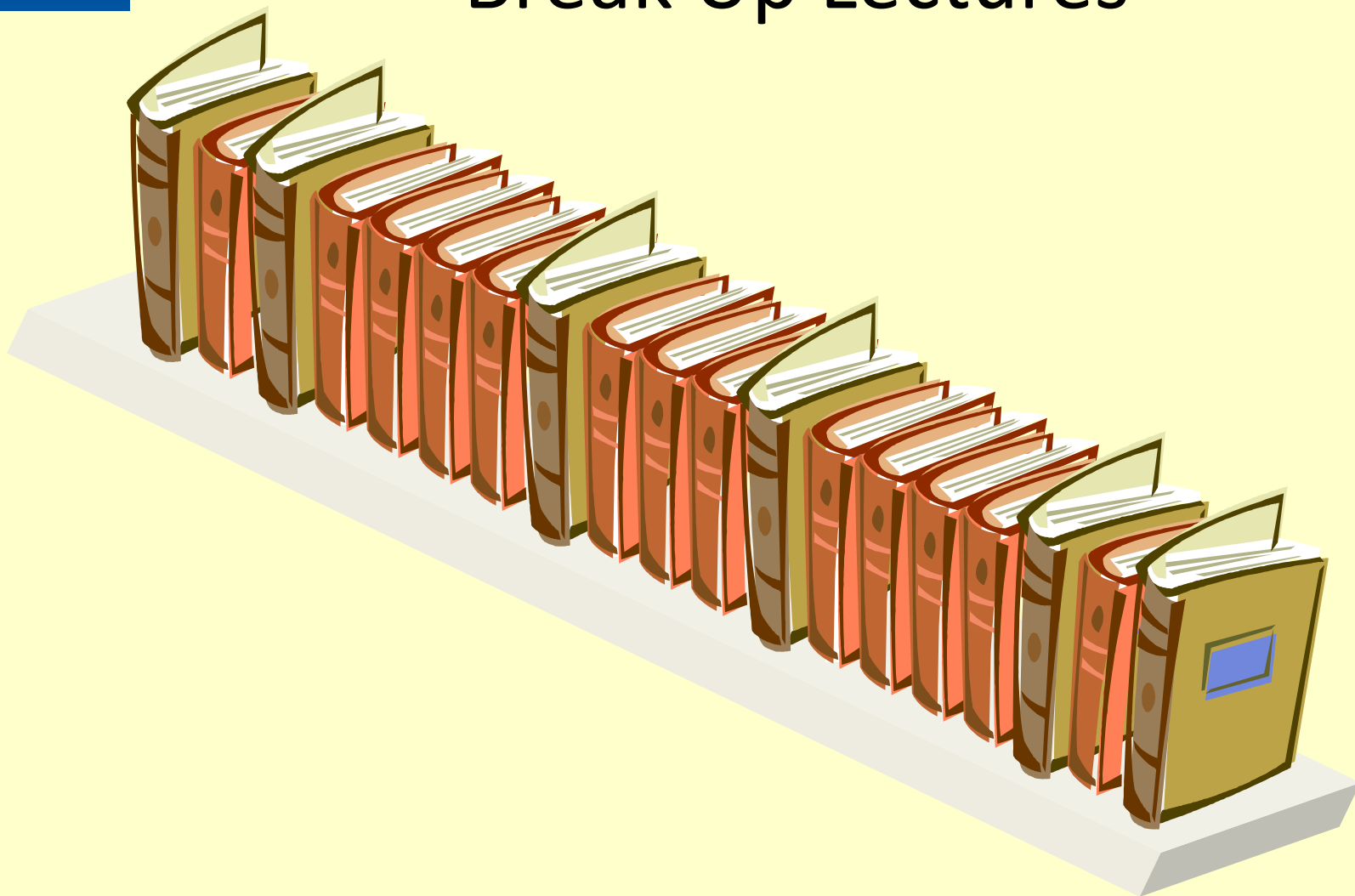
Even if you are
fascinating....

People only
remember
the first 15
minutes of
what you say





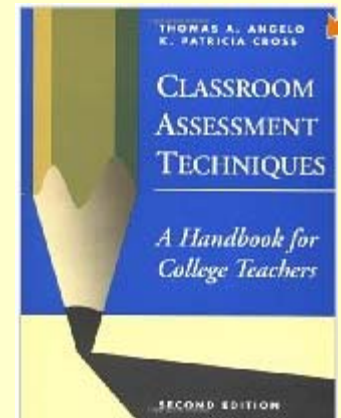
One Easy Suggestion: Break Up Lectures





Success in Classroom Active Learning

- The text *Classroom Assessment Techniques*, by Angelo and Cross, lists 50 different techniques or tasks that can be done, during class time, to assess student learning
- All these tasks require the kind of active learning we want students to be able to do in the classroom



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

http://www.uoregon.edu/~tep/resources/newteach/fifty_cats.pdf



One minute paper

- Construct one or two questions that students can answer quickly and briefly. Put the questions on an overhead/whiteboard/PowerPoint
- Set aside the first or last 5 minutes of class for the 1-minute paper.
- Distribute index cards or ask students to use a half-sheet of paper to write their responses.
- Ask students to respond to the questions frankly and concisely. They may use single words, short phrases or very short sentences.



One minute paper – some possible questions

- What was the most important (significant, crucial) thing you learned in today's class?
- List 3 key concepts from today's class.
- What is the main application of the material we discussed today?
- What did you learn today that you will use or apply after graduating?





More CATs

The muddiest point

- What was the muddiest point in the (lecture, discussion, homework assignment, ...)
- Ask for phrases or sentences
- Should be asked toward end of lecture



More CATs

One-Sentence Summary

- Answer the question:
 - “Who
 - does what
 - to what (or whom)
 - when
 - where
 - how
 - why?
- Example – Summarize the electronic design process.



More CATs

Directed Paraphrasing

- Reveals student's ability to summarize and restate important information or concepts
- The summary is to be aimed at someone who does not know the information
 - “Explain to your mother . . .”
- Example – In plain language and in 5 minutes, explain to a computer user why they should use virus-protection software



More CATs

Applications Cards

- Lets instructors know if students can look ahead to see application of technical information
- Have the students write down one possible, real-world application for what they have just learned
 - Example: Write down 2 lost-cost applications for using transistors in a electronic device



Success in Classroom Active Learning

- Make sure to “close the loop.” Let students know what you learn from their feedback, and how you and they can use the information to improve learning.
 - Students are unlikely to realize the value of their hard work (thinking hard during class), unless faculty make them explicitly aware of the technique and their goals.

