So what is a Classroom Assessment Technique (CAT)?

- **Classroom Assessment Techniques (CATs)** are "feedback devices" – simple tools for collecting data on student learning in order to improve it
  - CATs are a type of formative assessment
- Angelo and Cross (1993) Classroom Assessment Techniques – represents a compilation of peer-reviewed and tested CATs

CATs have another use …

CATs can turn a traditional lecture into a more interactive learning experience

Even in large lecture classes!(375+ students)

How Can CATs be used? Anatomy A215 as an Example

- At least 1 (and sometimes as many as 3 or 4) learning activities (modified CATs) used per lecture session.
- Students worked in small groups during class
- Feedback: during present lecture or in following lecture
- Time allotted: 5-15 minutes of every lecture
- Additional learning activities available on A215 WWW page: students encouraged to do these activities as “homework” and for review

Does the use of interactive learning exercises in A215 increase student engagement in lecture? (Answer: YES!)

**PROCESS measures**
- During lecture, 75-95% of individuals worked on the exercises
- Comments on evaluations – students said they used the interactive learning exercises at home and found them useful
- Review sessions: students would ask questions about learning activities that were not previously done in lecture (only found on Web)

**Evidence:**
- Students stayed more alert during lecture
- Learning exercises provided a ‘shifting of gears’ that refocused attention
- Gave me an opportunity to review concepts and see if there were common misconceptions
- Students said the interactive learning exercises improved lecture, on mid-semester and final evaluations

Tips for administering memory matrices

- Students can do these individually or in groups (I encouraged group learning, so students would realize their peers could help them and vice versa)
- Memory matrices best used at least a day AFTER the material was presented (give students time to absorb info, process it, and then see if they can recall it)
- Almost always went over answers/provided feedback immediately after using the matrix (students want to know “did I get this right?”)
CAT #5: Memory Matrix

- A 2-D rectangle divided into rows and columns – the row and column headings are given but the other boxes are empty
- Students must fill in the empty boxes (and therefore test their recall of the material)
- Useful in assessing student recall and basic comprehension of facts and principles
- Tests if students can adequately categorize the information they've learned

More Anat A215 memory matrices

- Articulations memory matrix
  http://www.indiana.edu/~anat215/articulations.html
- Muscles of Lower Limb memory matrix
  http://www.indiana.edu/~anat215/learningaids/muscleslowerlimb.htm
- ANS comparison of sympathetic/parasymp
  http://www.indiana.edu/~anat215/learningaids/sympvsparasymp.htm
- Bronchi vs. bronchioles memory matrix
  http://www.indiana.edu/~anat215/learningaids/bronchivsbronchioles.htm
- Ovarian Structures memory matrix
  http://www.indiana.edu/~anat215/learningaids/ovarianstructures.htm

My own CAT: Learning Exercise

- List anatomic structures, and then students have to number/order them properly
- Ex: list in order how food travels through the GI tract
- Ex: how does blood travel through the heart
- After students order the items, they are encouraged to make a flow chart and re-write the items in proper order
- Reinforces learning flow patterns better than just re-reading the text or notes
- Learning exercises administered in same manner as memory matrices (used at least a day after lecture, always provided feedback to the class, encouraged students to work in groups)

Modified CAT (#7) : “Muddiest Point” Surveys

1. What was the "muddiest point" in lecture for you, and what needs more clarification?
2. Working as a group, can you attempt to answer or clarify these points of confusion? Were you able to answer your questions?

(administer any time during class, collect and analyze responses that evening, fine tune class the following period)
Exam Evaluation (CAT #50)

- Get feedback and student reactions about specific exams
- Helps the instructor determine if the exam was fair and of adequate difficulty
- I have used this for many years – not as scary as you would think – I ask two questions:
  - Did you find the lecture exam easy, average difficulty or very hard?
  - Was the exam FAIR?
- I tabulate the results and report the numbers to the students the following class

Now it is YOUR turn!
What specific topics do YOU teach that would lend themselves well to a CAT? Sketch out a CAT for your own class now!

Mid-Semester Course Evaluation

1. What is “working” for you in this course? What components in lecture do you find valuable and worthwhile?
2. What isn’t working for you in this course? Are there items that simply aren’t helpful?

Now it is YOUR turn again!
Fill out our M620 mid-semester course evaluation:

What are some other examples of CATs?

- Misconception/Preconception Check (CAT #3)
- Empty Outlines (CAT #4)
- Minute Paper (CAT #6)
- Course-related Self-Confidence Surveys (CAT #32)
- Student-Generated Test Questions (CAT #25)
- Approximate Analogies (CAT #15)
- Assignment Assessments (CAT #49)

Misconception/Preconception Check (CAT #3)

- Purpose: to determine students’ prior knowledge and how this may help or impede with learning a current topic
- How to use:
  - Develop a list of ideas and beliefs that are most likely to interfere with learning in your course
  - Create a simple questionnaire to elicit information about student ideas and beliefs in this area (may want to use multiple choice, or likert scale answers, for easier analysis of data)
  - Explain to students the reason why you are using this CAT, and ensure them that data collected in anonymous
  - Once you collect/analyze data, you can target those misconceptions
Empty Outlines (CAT #4)

Purpose: to allow the instructor to determine how well students have "caught" the important points of a teaching presentation

Useful in classes where a large amount of data/facts are presented

How to use:
- Give students an empty or partially completed outline of an in-class presentation
- Students must fill in the blanks within an allotted period of time (instructor determines if students should fill item out with their notes, or have this a "closed book" assignment)
- Instructor provides feedback (reads out some sample outlines, or corrects outlines outside of class)

Minute Paper (CAT #6)

Purpose: To determine if students understand the big concept(s) presented in class

How to Use:
- Stop class a few minutes early
- Ask students to spend a minute or two answering the following questions: "What was the most important thing you learned during this class?" and "What important question remains unanswered?"
- Students turn in their responses, instructor tabulates responses and comments and provides feedback next class

Course Related Self Confidence Surveys (CAT #32)

Purpose: For instructors to assess students confidence in their ability to learn relevant skills and material

How to use:
- Focus on skills or abilities that are important to the success in the course (ex: doing venupuncture, reading an EKG, etc)
- Prepare a list of questions to assess students self confidence in these areas – use a qualitative or Likert scale for responses
- Distribute survey in class, assure class that responses are anonymous
- Variation of this CAT: give self-confidence survey early in the class and then later –see if self-confidence scores rise

Student Generated Test Questions (CAT #25)

Purpose: all faculty to see what students view the most important or memorable content, what they understand as fair and useful test questions, and how well they can answer the questions posed

How to use:
- Focus on exam or test about 3 weeks away
- Decide what types of questions on what specific topics you want students to generate
- Collect questions and then determine: how many required only a knowledge of facts and principles? Are some poorly written? Give feedback to class and read examples of well written questions that test more than just facts.
- (let students know that by preparing these questions, they are beginning their preparation/studying for the exam)

Approximate Analogies (CAT #15)

Purpose: so instructors may determine if their students understand the relationship between two concepts or terms given as the first part of the analogy (for learners, it helps them make knowledge connections)

How to Use:
- Select a key relationship between two facts/concepts
- Create an Approximate Analogy in this format “A is to B as X is to Y” – instructor fills in A and B, students must fill in X and Y variables (ex: osteoblast is to bone creation as ______ is to _______)
- Have students try to come up with relationships from everyday life
- Have students fill out responses, collect, and analyze feedback

Assignment Assessments (CAT #49)

Purpose: So the instructor can see the assessment through the students’ eyes, giving them feedback on the learning value of the assignment – also prompts students to evaluate the assignments as learning tools

How to use:
- Choose an assignment to assess
- Prepare a simple assignment assessment form that has 2 or 3 questions to assess the value of the assignment to students’ learning (for example, have students assess assignments for their relevance to their future jobs/careers, or one can simply say “list the positives of the assessment, the negatives, and ways for improvement”)
References

- Anatomy A215 WWW site: http://www.indiana.edu/~anat215 (click on "learning exercises" button)