Classroom Assessment/Activities Techniques - CATs

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A Guide for Faculty and Teaching Assistants

The following guide is designed to explain and give examples of how in-class assessment can enhance university teaching and learning. These techniques are based on the work of Angelo and Cross (1993).

What Are CATs?

Classroom Assessment Techniques (CATs) are, typically, ungraded activities conducted in the classroom setting. Their purpose is to provide the instructor feedback on whether or not students understand course material so that adjustments can be made before the end of the term. Frequent use of CATs also can assure students that the instructor takes a genuine, active interest in their learning process throughout the course, before the summative assessment (e.g., final exam) is given at the end of the term.

Why Should I Use CATs?

Frequent use of CATs:

- Provides regular feedback about student learning, addressing difficulties and misunderstanding before heavily-weighted assessments.
- Models learning as an ongoing and evolving process that can be modified as needed.
- Provides students with a means of gauging their own learning practices and then modify study strategies as appropriate.
- Helps students feel less anonymous in large class settings, since it is concrete evidence that the instructor cares about student learning.
- Provides "food for thought" for instructors as they reflect on their teaching and on a particular course at the end of term.

Implementation and Examples of CATs

Tips on implementation:

- Start off simple by choosing a technique that easily fits your teaching style and classroom time limits.
- Conduct at least one CAT before the first major assignment, so that you can intercept any problems or questions before the fact.
- Don't feel obligated to do a CAT every day or every week. You'll create information overload for yourself and your students.
- When you do any CAT, explain its purpose and your goal clearly to students.
- Report your findings to your students and let them know what you plan to do in terms of their feedback.

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[1] Page 1 text drawn from George Washington University's Teaching and Learning Center webpage on CATs.

[2] Pages 2-4 developed by Anita Gonzalez and Ilene Alexander for the UMTC Preparing Future Faculty Program.

Selected CATs, or Classroom Assessment Techniques, for Use in Sparking & Assessing Students' Learning

Organized by Prep Levels, from Low to Medium to High

Name	Description	What to do with the data	Prep Levels
Minute paper	Commonly administered at the end of class, the minute paper typically asks "What was the most important concept you learned in class today?" or, "What do you see at 1 or 2 main points of today's activities/lecture/discussion?" to gain a sense of student comprehension related to the day's specific focus. Prompts can also pose reflection-oriented questions.	Review responses and note any useful comments. During the next class period emphasize the issues illuminated by your students' comments. For a helpful inventory of comprehension and reflection questions, see the OnCourse Minute Paper resource. This writing often provides the foundation for the "Think * Pair * Share" strategy: students write, then talk in pairs or trios about ideas, with some sharing with the entire class.	Prep: Low In class: Low Analysis: Low
Chain notes	Students pass around an envelope on which the teacher has written one question related to the class session. When the envelope reaches a student they write a brief response to the question, returns the response sheet to the envelope, and passes it to a next student.	Go through the student responses and determine the best criteria for categorizing the data with the goal of detecting response patterns. Discuss the patterns of responses with your students.	Prep: Low In class: Low Analysis: Low
Focused listing	In a given time period, students write down as many ideas that are closely related to a single important term, name, or concept. Useful in large & small courses in which a large amount of new information is regularly introduced.	The simplest way is to sort the responses into "related" or "unrelated." Then you can classify the responses according to the type or degree of relation to the focus topic (e.g., examples, definitions, illustrations; primary, secondary, tertiary relations).	Prep: Low In class: Low Analysis: Low

Application cards	After teaching about an important theory, principle, or procedure, ask students to write down at least one context-specified application for what they have just learned..	Quickly read once through the application and categorize them according to their quality. Pick out a broad range of examples and present them to the class.	Prep: Low In class: Low Analysis: Medium
Approximate analogies	To find out whether students understand the relationship between two concepts, the complete the second half of an analogy – A is to B as X is to Y – for which their instructor has supplied the first half (A is to B).	Quickly sort the responses into three piles, “good,” “poor/wrong,” and “in doubt.” Go over the “in doubt” pile several times to exhaust it. Select examples from each group to bring to the class and discuss what makes the analogy a good/poor choice.	Prep: Low In class: Low Analysis: Medium
Difficulties / Muddy point	Ask students to write an informal response to one question: “What was the muddiest point in _____?” The focus could be a lecture, a discussion, homework, a play, or a film.	Quickly read through at least half of the responses, looking for common types of muddy points. Sort them by affinity. Use a principle (number, concepts, skills) to decide which to deal with in class.	Prep: Low In class: Low Analysis: Low
Insights / Clear skies	As with the Muddy Point prompt, ask students to write a response to a single question: “What was the clearest point for you in ___? The focus here could be a reading, presentation, in class discussion/activity, or class prep task.	Quickly read through at least half of the responses, looking for a pattern in what students identify as points of understanding/connection related to course materials/concepts. Sort them by affinity to begin determining what to address and/or how to build on these in class.	Prep: Low In class: Low Analysis: Low
Directed paraphrasing	Students write a “translation” of something they have just learned for a specified individual, audience, or purpose audience to demonstrate comprehension and engage retrieval.	Categorize student responses according to characteristics you feel are most important. Analyze those responses both within and across categories, noting ways you could address student needs.	Prep: Low In class: Medium Analysis: Medium

3 – 2 – 1 response	As preparation for class: Students read/annotate assigned readings, review in order to respond to the following: ● 3 things learned – ideas, issues, insights. ● 2 examples of how to apply the ideas, issues, insights to case challenge. ● 1 unresolved "something," which you can express as a question, name as an area of confusion, or point to as a difficulty.	In small discussion groups, individuals can draw on what they've written to set out the group's multiple and/or shared perspectives, and then collaborate to create a 3-2-1 that can be shared with the entire class for follow up discussion. Teachers might collect each group-generated 3-2-1 response to review and draw on as the basis for follow up full group discussion. Evaluate the individual and/or group writings to assess students' critical reading acumen.	Prep: Low In class: Medium Analysis: Medium
One-sentence summary	Students summarize knowledge of a topic by constructing a single sentence that answers the questions, "Who does what to whom, when, where, how, and why?" The purpose is for students to define features of an idea.	Evaluate the quality of each summary quickly and holistically. Note whether students have identified the essential concepts of the class topic and their interrelationships. Share observations with your students.	Prep: Low In class: Medium Analysis: Medium
Background knowledge probe	Before introducing an important new concept, subject, or topic, students respond to questions that will probe their existing knowledge of that concept, subject or topic.	Classify responses into groups (e.g., prepared/non-prepared; no knowledge/erroneous knowledge/OK knowledge). Use the information to revise your plans for teaching this topic.	Prep: Medium In class: Low Analysis: Medium
Goal ranking/ matching	Used in the first week of class; students list the learning goals they hope to achieve through the course and rank the relative importance of those goals.	Look for patterns in students' goals and categorize them accordingly. Contrast the list and rankings with your own ranked goals. Report back indicating how and why you will include (or not) the goals mentioned by the students.	Prep: Medium In class: Low Analysis: Low/ Medium
Misconception check	Students respond to a questionnaire that elicits information about ideas and beliefs that may hinder or block further learning.	Organize the information to answer these questions: What misperceptions or preconceptions do students have that may interfere with learning? How many students have them? How deeply embedded are these?	Prep: Medium In class: Low Analysis: Medium

Memory matrix	Students fill in cells of a two-dimensional diagram for which the instructor has provided labels. For example, in a music course labels might consist of periods (Baroque, Classical) by countries (Germany, France); students enter composers in cells to demonstrate their ability to remember and classify key concepts.	Tally the numbers of correct and incorrect responses in each cell. Analyze differences both between and among the cells. Look for patterns among the incorrect responses and try to determine what the cause might be.	Prep: Medium In class: Medium Analysis: Medium
Student generated test questions	Ask students to write test questions and model answers for specified topics. This will engage students in evaluating course topics, reflecting on what they understand, and in learning to develop good questions.	Make a rough tally of the questions your students propose and the topics that they cover. Evaluate the questions and use the good ones as prompts for discussion. You may also want to revise the questions and use them on the upcoming exam.	Prep: Medium In class: High Analysis: High
RSQC2	This 5-step protocol – Recall, Summarize, Question, Comment, and Connect – can be used to engage students in focusing on a previous class/lab session, a section/unit at its mid-point or closing stages, or even to focus on single reading/lecture or set of either. Teachers develop one question/prompt for each of the five steps, aiming to engage students in gathering and synthesizing data, expressing new questions, and connecting the pieces to express new understandings and/or insights.	The five steps can be woven into a class session, providing a framework for actively engaging students throughout a lecture or activity; the Recall and Summarize steps can be embedded in students' assigned preparing for class work, serving as the "ticket in" for a class session. The development of questions provides opportunities for students to engage in peer learning and to ask authentic questions during class. By using note cards or student response systems allowing for paragraph answers, instructors can collect Comment and Connect responses, for review, reviewing for levels of understanding as part of planning a next presentation, an upcoming review session, follow up homework, and/or a general report to students,	Prep: Medium In class: High Analysis: High

Discussion Learning - Ideas from Stephen Brookfield / Workshop Packet, available at www.stephenbrookfield.com

Learning Audit

Might be linked to a reading activities across a period of time, to a lab/experiment, to internships/ field placements/community projects, and so on:

- What do you know now that you didn't know this time last week?
- What can you do now that you couldn't do this time last week?
- What can you teach someone else to know or do now that you couldn't teach them this time last week?

Discussion Audit

When moving from small to large class discussions one way to make the transition is to use a discussion inventory. Here each member of the small groups writes a brief response to one of the following questions:

- What was the most important point made in the small group discussion you've just had?
- What was the most confusing or puzzling point made in the small group discussion you've just been part of?
- What new learning happened in the small group discussion you've just had?
- Based on your small group discussion, what idea do you think it would be good explore more deeply in the next part of class?

Discussion Inventory

One approach we have found useful is to tell students at the start of a particular class that you will be saving five to ten minutes towards the end of that day's discussion period to give some of your own reflections on the discussion. We view this as keeping a 'Discussion Inventory' that will be unpacked just before students leave. The inventory is essentially a list of the things we want to make sure students are exposed to before they exit the room that day. It is blank at the start of the discussion but fills up as we jot down errors we hear, perspectives that we feel are glossed over or ignored, and important oppositional views that we think are too easily rushed past. A good time to unpack this inventory is immediately prior to inviting anyone in the group to have the last word that day (itself an idea picked up from Ira Shor (1996)).

In the five-minute inventory time we provide information about perspectives that were missed during the discussion and we offer alternative interpretations that students did not wish to consider. This is also an excellent time for us to draw students' attention to what we consider to be major errors of understanding we have noticed being expressed during the conversation. Sometimes in the middle of a discussion that is going well someone makes a statement that we know shows a complete misunderstanding of a concept, or is clearly factually wrong, but we feel uncomfortable interrupting the flow of talk at that particular time and singling that contributor out as somehow lacking. When that erroneous statement is made we jot down a note on our inventory pad to make sure we address it in the time we've reserved for ourselves towards the end of the class that day. So the discussion inventory allows us to correct mistakes and to tackle repressive tolerance by making sure participants do not leave the room without being exposed to a perspective we feel it is necessary for them to encounter.

Minute-Paper Prompts – Changing Up the Questions You Ask

from p. 1 OnCourse Minute Paper resource – **http://oncourseworkshop.com/self-awareness/one-minute-paper/**

Over the years, I have used a wide range of questions as prompts for minute papers. Below, I have listed some of my most frequently used minute-paper questions and attempted to categorize them in terms of what cognitive or affective dimension of the student's learning experience they are designed to prompt.

Interest:

- Without looking at your notes, what was most memorable or stands out in your mind about today's class?
- What was the most surprising and/or unexpected idea expressed in today's discussion?
- Looking back at your notes, what would you say was the most stimulating idea discussed in today's class?
- For you, what interesting questions remain unanswered about today's topic?

Relevance:

- In your opinion, what was the most useful idea discussed in today's class?
- During today's class, what idea(s) struck you as things you could or should put into practice?
- What example or illustration cited in today's class could you relate to the most?

Attitudes/Opinions:

- Would you agree or disagree with this statement: . . .? Why?
- What was the most persuasive or convincing argument (or counterargument) that you heard expressed in today's discussion?
- Was there a position taken in today's class that you strongly disagreed with, or found to be disturbing and unsettling?
- What idea expressed in today's class strongly affected or influenced your personal opinions, viewpoints, or values?

Analysis:

- What did you perceive to be the major purpose or objective of today's class?
- What do you think was the most important point or central concept communicated during today's presentation?

Conceptual Connections:

- What relationship did you see between today's topic and other topics previously covered in this course?
- What was discussed in class today that seemed to connect with what you are learning or have learned in other course(s)?

Course/Assignment Closure - Practices Used by CEI staff

3-2-1 Have your students write down

- three key concepts they'll remember,
- two ways they can apply what they've learned, and
- one burning question they still have.

If you do this during this penultimate week of the semester, you'll have opportunities for working with students to address those burning questions ahead of finals. And, you will learn not only what students consider the most salient aspects of your course, but also gain a sense of how they might use them.

Headline The "ask" is for students to write a headline using just six to eight words to summarise what they'll remember most from this course. Whether the course meets online or in person, you can collect these – on index cards, via ChimeIn or a GoogleDoc or the white board, see what themes emerge, and frame a closing discussion about alignments and divergences among the responses. The headlines can also help instructors verify whether intended messages have resonated with students.

Letter to future students One person responding to a *Chronicle* invitation to share "closure" activities recommended having students write a letter to future students, giving them advice on how they can do well in your course. This can give your students a chance to reflect on what they've learned and you a chance to see what they think is important. With permission, you could share these letters with future students. You could also consider, as Stephen Brookfield does, asking current students if they would be willing to tape responses through FlipGrid or come to campus at the beginning of the next semester to share these thoughts with your new class. Brookfield notes that former students, especially those who were initially resistant, often have more credibility with their peers and that current students will buy into what they have to say with much greater ease.

Class closure cards The questions teachers create for this card deck could include:

- What was the big picture of this course?
- What information was most surprising?
- What areas need further research for your to fully understand the complexity of this topic?
- How did your view of the subject change over the course of the class?
- Have you changed your opinion of the course topic as a result of this course? If so, how? If not, why?

Students work in small groups or teams that have worked together across a term – each group draws a card, then prepares a response to share with the class; 10 minutes for groups to prepare, each getting 5 minutes to share.

Acknowledge peer support Provide a few moments in class for students to stand up and approach a few classmates to thank them for any help or insight they may have provided for their progress and learning in the class. Students might share some generalisations from this on the whiteboard as part of moving from the individual interactions to a fuller class discussion.