Simple and Effective Classroom Assessment Techniques to Improve Teaching and Learning

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Prior Knowledge Inventory Example

What does CAT stand for?

What word comes to mind when you hear assessment? Why?

What is the purpose of classroom assessment?

What are CATs and Why Use them?

Classroom Assessment Techniques

“Simple, non-graded, in-class activities designed to give you and your students useful feedback on the teaching-learning process.”

Purpose of Classroom Assessment

1. **Formative**: To inform teaching and improve learning

2. **Context-Specific**: Chosen to fit the subject matter and needs of the particular class

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<th>Question</th>
<th>CATs</th>
</tr>
</thead>
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<td>What have students learned?</td>
<td>Prior Knowledge Inventory, Misconception/Preconception Check</td>
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<td>Focused Listing, Empty Outlines, Memory Matrix</td>
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<td>How are students learning? What is hindering students?</td>
<td>Minute Paper, Muddiest (Cleariest) Point, Punctuated (Clarification) Pauses, Fish Bowl</td>
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</tr>
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<td>Course-Related Self-Confidence Survey</td>
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<td>What do students think/feel/value?</td>
<td>Reading Rating Sheet, Group Work Evaluation, Minute Papers</td>
</tr>
</tbody>
</table>


Adapted from Parkland College Center for Excellence in Teaching and Learning
Misconception/ Preconception CAT

Designed to uncover incorrect or incomplete knowledge, attitudes, or values that may be barriers to new learning.

Examples:
• Native Americans who stay on the reservation are better off. (Anthropology)  
  Strongly Disagree   Disagree   Don’t Know   Agree   Strongly Agree
• What makes the seasons change? (Astronomy)
• How may people lived in North America in 1491? (North American History)

With this feedback…
• Faculty can determine what common misperceptions might interfere with course learning.
• Help students recognize and understand misconceptions/preconceptions early on in order to better integrate correct information into revised knowledge structure.
Prior Knowledge Inventory
Or Misconception/Preconception Check

Write 2 or 3 short simple questions for use at the beginning of a course (or at the start of a new unit or lesson) prior to introducing an important new topic to determine what students already know about the topic/subject or what their perceptions are on a topic.

Prior Knowledge Inventory and Misconception/Preconception CATs

**Fast Analysis:** responses can be sorted into "prepared" and "not prepared" piles.

**Detailed analysis:** answers can be classified into the following four categories: 

- [-1] = erroneous;  
- [0] = not relevant;  
- [+1] = some relevance;  

**With this feedback...** Faculty can determine the most effective starting point for a given lesson and the most appropriate level at which to begin instruction. Can also be used as pre- and post-assessments.

Assessing Content/Material

Focused Listing

Chooses a single important term, name, or concept from a particular lesson or class session and directs students to list several ideas that are closely related to that “focus point.”

Examples:
Write 5 or 6 words or phrases that define… [work in Physics]. Define 3 to 4 concepts of related to … [stocks in Finance]. After watching a film or slides list terms to describe… [Classical Persian art]. List six important characteristics of …[CATs].

Assessing Content/Material

Memory Matrix

**Examples:**
Place the names of major artists in the appropriate cells.

<table>
<thead>
<tr>
<th></th>
<th>France</th>
<th>United States</th>
<th>Britain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neoclassicism</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impressionism</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-impressionism</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expressionism</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Fill in the blank cells with as many different base form verbs as you can recall.

<table>
<thead>
<tr>
<th></th>
<th>-ar</th>
<th>-er</th>
<th>-ir</th>
</tr>
</thead>
<tbody>
<tr>
<td>Irregular</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regular</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Focused Listing or Memory Matrix

Choose a single important term, name, or concept from a particular lesson or class session and direct students to list several ideas that are closely related to that “focus point” or create a memory matrix that students can fill in.

With this feedback…

Faculty can determine where more emphasize might be needed in future lessons, make midpoint corrections, and measure the class’ progress in learning one element(s) of the course content.

Assess Understanding

Minute Paper

During the last few minutes of the class period, ask students to answer on a half-sheet of paper or for the Email Minute have them email responses:

- “What is the most important point(s) you learned today?”
- “What point(s) remains least clear to you?”

Other possible questions:
- How was the pace of the class?
- Were the examples clear? If not, which and why?
- Were the topics presented sufficiently? If not, which and why?
- What is one small change that I could make that would help you learn more effectively in class?
- If you were the instructor for this class, what would you do to make the assignments more useful?
- What specific questions do you have?
More Possible Questions for the Minute Paper

1. At what moment were you most engaged as a learner?
2. At what moment were you most distanced as a learner?
3. What action was most helpful?
4. What action was most puzzling or confusing?
5. What surprised you?

Minute Paper

Choose 1 or 2 questions to use for a Minute Paper this month in one of your classes.
Minute Paper

Review responses looking for common themes and questions and note any useful comments or comments that require responses.

With this feedback…

- Teachers can decide whether any mid-course corrections or changes are needed and, if so, what kinds of instructional adjustments to make.
- Emphasize the issues illuminated by your students’ comments.

Assessing Understanding

Muddiest Point: At the end of class, ask students to jot down a quick response to one question:

“What was the muddiest point in the … [class meeting, readings, homework assignment, lecture, etc.]?”

Additional question (Bateman & Roberts, 1992):
What percent of mud was due to:
  a. Unclear presentation by instructor?
  b. Lack of opportunity to ask questions?
  c. Your lack of preparation?
  d. Your lack of participation in class instruction?
  e. Other?
What is the Mud Due to?

Review Responses
Quickly read through at least half of the responses, looking for common types of muddy points. Then go back through all the responses and sort them into piles - several piles containing groups of related muddy points, and one "catch-all" pile made up of one-of-a-kind responses.

With this feedback
Faculty can discover which points are most difficult for students to learn and this can guide their teaching decisions about which topics to emphasize and how much time to spend on each.
Categorizing Grid: Students are given a grid containing two or three important categories along with a scrambled list of items, which students must then sort into the correct categories.

<table>
<thead>
<tr>
<th>Theory/Category X</th>
<th>Theory/Category Y</th>
</tr>
</thead>
</table>

Analysis

Look for patterns in incorrect responses that can help you determine which kinds of examples or categories are most difficult for students.

With this feedback

- Faculty can determine quickly whether, how, and how well students understand “what goes with what.”
- Students can also see if they need to revise their categorizing rules.
Pro and Con Grid: Students are given a grid containing two or three important categories along with a scrambled list of items, which students must then sort into the correct categories.

Examples:

English: Hamlet: Pros and cons for murdering stepfather, Claudius

Anthropology: Pro and Cons of returning native objects from natural history museum

Political Science: Costs and Benefits of redistricting

Civil Engineering: Advantages and disadvantage of a design

Bioethics: Pros and cons of cloning
Assessing Skill in Analysis and Critical Thinking

Create a Categorizing or Pro/Con Grid for an upcoming lesson or assignment.
Assessing Skill in Analysis and Critical Thinking

Pro and Con Grid

**Analysis:** Do a frequency count for the pros and cons students have listed, which points are mentioned most? Compare the students’ grids to yours to see if they have excluded points or included extraneous points.

**Feedback** provides faculty a quick overview of a class’s analysis of the pros and cons. Faculty can thus see the depth and breadth of the students’ analyses and their capacity for objectivity.

Directed Paraphrasing: Students are asked to write a layman’s “translation” of something they have just learned (1 to 3 sentences)— geared to a specified individual or audience— to assess their ability to comprehend and transfer concepts.

Example:
Paraphrase what you have learned about reasons for using CATs. Direct your paraphrase to a colleague with no knowledge of CATs.

Analysis: review the responses and look for common patterns of clarity and confusion

With feedback…make any necessary enhancements to the content of the class.

Application Cards: After learning about an important theory, principle, or procedure, students are asked to write down at least one real-world application for what they have just learned.

Analysis: Quickly read once through the applications and categorize them according to their quality. Pick out a broad range of examples (including both excellent and marginal/unacceptable examples) and present them to the class.

Feedback shows faculty how well students understand the possible applications of what they have learned.

Student-Generated Test Questions: Students write test questions—Multiple choice, T/F, Fill-In the Blank, Essay— for specified topics and model answers.

To summarize: Tally the types of questions students propose and look at the range of topics the questions span.

Feedback illustrates at least four aspects of student learning:
1. What students consider the most important or memorable content,
2. What students understand as fair and useful test questions, and
3. How well students can answer the questions they have posed.
4. Alerts faculty to when students have inaccurate expectations about upcoming tests.

Example: Course-Related Self Confidence Surveys for College Algebra

This survey is to help both of us understand your level of confidence in your math skills. Please indicate how confident you feel about your ability to do the various kinds of problems listed below. Circle the most accurate response for each.

<table>
<thead>
<tr>
<th>Kinds of Problems</th>
<th>Self-Confidence in Your Ability to Do Them</th>
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</thead>
<tbody>
<tr>
<td>Addition &amp; Subtraction</td>
<td>None</td>
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<tr>
<td>Multiplication</td>
<td>None</td>
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<tr>
<td>Division</td>
<td>None</td>
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<tr>
<td>Fractions</td>
<td>None</td>
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<tr>
<td>Decimals</td>
<td>None</td>
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<tr>
<td>Graphing</td>
<td>None</td>
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</tbody>
</table>

Now create your own Course-Related Self Confidence Surveys

This survey is to help both of us understand your level of confidence in your [blank] skills. Please indicate how confident you feel about your ability to do the various kinds of activities listed below. Circle the most accurate response for each.

<table>
<thead>
<tr>
<th>Activity/Skill</th>
<th>Self-Confidence in Your Ability</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>None</td>
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<tr>
<td></td>
<td>Low</td>
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<td>Medium</td>
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</table>
Learner Reactions to Class Assignment and Materials

Designed to give faculty information that will help them to improve their course materials and assignments.

Reading Rating Sheets
Students complete a form that rates the effectiveness of the assigned readings.

Example

Title of Reading
1. How well did you read this assignment?
   a. Completely and carefully   b. Completely, but not carefully
   c. Only partially, but carefully   d. Not completely or carefully
2. How useful was this assignment in helping you understand the topic?
   a. Very useful   b. Useful   c. Not very useful   d. Useless
3. How clear and understandable was the reading?
   a. Very   b. Adequately   c. Not very   d. Not at all
4. Having read the assignment do you think I should assign it again next term?
   Yes   No
5. Please explain your answer to #4 in a sentence or two.
1. Overall, how effective did your group work together on this assignment? (Check the appropriate response)
   □ Poorly  □ Adequately  □ Well  □ Extremely well

2. How many of the **five** group members participated actively most of the time? (Check the appropriate response)
   □ 0 □ 1 □ 2 □ 3 □ 4 □ 5

3. How many of you were fully prepared for the group work most of the time? (Check the appropriate response)
   □ 0 □ 1 □ 2 □ 3 □ 4 □ 5

4. Give one specific example of something you learned from the group that you probably wouldn’t have learned working alone.

5. Give one specific example of something the other group members learned from you that they probably wouldn’t have learned otherwise.

6. Give one specific change that the group could make to improve its performance.
In Conclusion
Benefits of CATs

For faculty, frequent use of CATs can:

• Provide short-term feedback about the day-to-day learning and teaching process at a time when it is still possible to make mid-course corrections.

• Provide useful information about student learning with a much lower investment of time compared to tests, papers, and other traditional means of learning assessment.

Benefits for Students

For students, frequent use of CATs can:

- Engage students in the assessment process.
- Help students become better monitors of their own learning.
- Point out the need to alter study skills.
- Allow them to be as honest as possible when done anonymously.

Three Steps to Using CATs Effectively

Step 1: *Decide* which CAT will provide the information that you desire or need.

Consider Time and Energy Required
CATs are ranked *(Low, Medium, High)* by time and energy required in three areas: *Prep, In class, and Analysis.*
Step 2: *Implement* the CAT.

Give clear directions for implementing each CAT. Most CATs are administered in the last few minutes of class and require notecards or half-sheets of paper.
Step 3: *Respond* to the feedback collected

Review the responses before the next class and decide what changes if any need to be made. For example…
- Revisit a topic already discussed
- Assign a new reading
- Use more small group discussion

Share a summary of students’ responses and explain what changes will be made if an area for improvement is indicated based on student input. If no changes, explain why.

Always complete the **Feedback Loop**. Feedback from students is matched with feedback from instructor!

When changes are made as a result of student feedback, students understand that the process has credibility and their input is valued.

**Most Important Step!**
Angelo, T. A., & Cross, P.H.

*Classroom Assessment Techniques: A Handbook for College Teachers.*

(2nd ed.) San Francisco: Jossey-Bass, 1993
Further Resources


Assessment Cycle of Continuous Improvement

The loop represents the continuous nature of assessing student learning outcomes. Assessment is comprised of several steps. Click on any step to access information and resources on that topic.
Questions

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