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Using classroom/learning assessment techniques (CATs) in biology labs and classes

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Have you ever wondered how your students are doing in your lab or class, or where they are in their unique learning journey? How can you assess or check-in with your students before the end of the term? How can your students self-assess where they are in your lab or class relative to the course intended learning outcomes?

Obtaining informal student feedback is where Classroom Assessment Techniques, or CATs, can support as an educational tool for instructors, Teaching Assistants (TAs), lab coordinators, and other educators in not only identifying where your students are, but also informing and supporting your own teaching. CATs have the additional role of supporting our students by serving as a self-assessment tool and as a frequent check-in throughout the term.

Classroom Assessment Techniques are generally anonymous, non-graded, in-class or in-lab activities for obtaining feedback from students around their learning. They help students to self-assess their own progress in a course or lab. CATs may highlight areas of confusion or uncertainty for students, and they can signal to an instructor that perhaps additional support, readings, or a revisit the next class on a specific topic is needed. They can also serve as a quick check-in with students around a lab protocol before embarking on an experiment or assay.

Angelo and Cross (1993) argued that CATs are an effective way to receive meaningful feedback from your students related to your teaching and can inform the learning taking place by the students. CATs can range from a short 2-minute exercise to a longer exercise and are highly adaptable and modifiable to fit your unique class or lab dynamic and your teaching needs.

Commonly used examples include a minute paper, muddiest point, one-sentence summary, application card, or flash cards – but there are many more. You can review an abbreviated version of 50 different CATs here. What follows is one interpretation of how to use a few different CATs, but it is not the only way you can use the CAT. Depending on where you look or who you ask, there may be different ways that others share how they use CATs. You can adapt and modify any CAT to support the needs of your unique student group, your teaching interests and needs, and your lab or class environment.

A minute paper is a CAT that you can use whenever you want to give students a pause in their learning (Bachhel and Thaman, 2014) to synthesize what they have learned in one minute (or so). You can give the students a prompt based on the learning that has occurred and ask them to write what they are taking away in one minute. Then, you can collect those papers (or if it is electronically completed you can review the submissions) and quickly glance to see what the key components your students are taking away. If what they have written does not match what you were hoping they would take away, you may need to either revisit your intended learning outcomes, provide supplemental materials, or revisit the topic next class.

The one-sentence summary prompts students to synthesize their learning from a certain unit, topic, or module into a single sentence. Often, the prompt can be written in such a way that students

are asked to address the ‘what, how, and why’ or maybe the ‘when, what, and how’, or any combination of the ‘who, what, when, where, why, and how’ qualifiers. You could extend the learning opportunity and ask students to share their sentence with a peer to engage in discussion and peer-learning, and then ask students to submit their sentences. From there, similar to the minute paper, you could review the submissions and determine next steps to support your students. Record the steps you take to support your students based on the CAT feedback. This information informs your teaching practice and showcases your growth as an educator.

When thinking about which CAT to use, it is important to align the CAT with your course or lab intended learning outcomes. Thinking about the Revised Bloom’s Taxonomy (Krathwohl, 2002) as one framework for writing intended learning outcomes can help in evaluating which CAT might be most supportive for you in assessing student learning and your own teaching. If there is misalignment, it may be a good opportunity to reflect and evaluate your own teaching practices to support your students.

Overall, CATs are fun and interactive activities to informally check-in with your students throughout their learning journey and to receive early and continual feedback from your students as the term progresses. Specifically in biology labs and classes, CATs can be extremely helpful in supporting students with new protocols or applying theory to in-lab exercises. Depending on how you implement different CATs, they can provide you with substantial feedback that can support your own growth as an educator and provide a glimpse into where student learning is in relation to a specific topic, unit, or module.

In this interactive session, we discussed the utilization of CATs in the many forms biology labs and classes can take shape with multiple examples and most importantly practiced trying out different CATs in the pursuit of obtaining feedback on your teaching. Our intended learning outcome for the session was that through active discussion and a reflective activity, you would practice utilizing different CATs to inform your teaching.

Keywords: science education, teaching, learning, assessment, classroom assessment techniques, bloom’s taxonomy, learning-centred teaching

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