SPECIAL EDITION ON CLASSROOM ASSESSMENT TECHNIQUES

# Classroom Assessment Techniques: A Conceptual Model for CATs in the Online Classroom

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*Formative assessments are an important part of the teaching and learning cycle. Instructors need to monitor student learning and check for understanding throughout the instructional phase of teaching to confirm that students understand the objective before embarking on the summative assessmwent. Typically, online classrooms are developed with weekly learning modules that end with a summative assessment in the form of an assignment or quiz. This leaves instructors with the task of constructing formative assessments each week. This article establishes a conceptual model for online classes that demonstrates the steps for implementing Angelo and Cross's (1993) Classroom Assessment Techniques (CATs) in this modality. Steps to implement CATs in the online classroom will be discussed.*

In higher education, two main types of assessments have emerged, formative assessments and summative assessments. While both of these types of assessment are vital to instructional strategies and the measurement of learning outcomes, formative assessment serves as the basis of the following theoretical model. Formative assessments and feedback are used in traditional and online classrooms to manage learning processes and to inform instruction and decision making (Nicol & Macfarlane-Dick, 2006). Boston (2002) defined formative assessments as "opportunities to assess how students are learning and then use this information to make beneficial changes in instruction" (para. 1). Traditionally, online courses have been designed with only summative assessments in place, such as graded discussion questions, participation, weekly assignments, quizzes, and exams. However, formative assessments are also necessary to check for student understanding in the online classroom prior to the summative assessment. This article will examine Angelo and Cross's (1993) Classroom Assessment Techniques (CATs) and present a theoretical model on how to implement CATs in higher education for the online classroom.

## CLASSROOM ASSESSMENT TECHNIQUES

To identify mastery of a given concept, there is a need to know what students have learned as well as what they have not. Angelo and Cross (1993) explained that there are often significant gaps between what was taught and what was actually learned. In addition, it is often too late by the time the teacher has identified what objectives the learner has not mastered because the summative assessment has been administered. It becomes essential to utilize formative assessments within the classroom to ensure that students are indeed learning what they need to learn. More specifically, CATs are utilized as one method to bridge the learning gap that may occur between teacher and student. Angelo and Cross (1993) stated, "The central purpose of Classroom Assessment is to empower both teachers and their students to improve the quality of learning in the classroom" (p. 4). Through the implementation of CATs, instructors can use formative assessments within the classroom to address the instructional goal of meeting student learning needs.

## FORMATIVE ASSESSMENT IN THE TRADITIONAL CLASSROOM

For the purposes of this paper, traditional classrooms are those that use a face-to-face delivery mode at an institution of higher education. Classroom assessment has been an educational concept long before Michael Scriven named the distinction between formative and summative evaluation in 1967 ("Evaluation Research," 2001). There are a number of reasons to use assessment and evaluation within a classroom, such as identification of student learning outcomes, a modality for feedback from the teacher to student, or vice versa. Black and William (as cited in Nicol & Mcfarlane-Dick, 2006) gathered over 250 studies dating back to 1988 to examine the effects of feedback. The goal was to explore real teaching situations and both teacher- and student-made assessments. Black and William (as cited in Nicol & Mcfarlane-Dick, 2006) found teacher and student feedback beneficial. Effective feedback led to learner gains. The ideas these scholars address could improve the use of formative assessments by providing students the opportunity for self-assessment, offering specific and meaningful feedback, and guiding students to improve their learning outcomes. These suggestions align well with the use of formative assessments in the online modality.

Within the traditional higher education classroom, teachers and instructors alike have been using assessment to determine student knowledge and learner outcomes. When an instructor is aware of the rate and level in which his or her students are progressing, in addition to when students are struggling, adjustments can be made during instruction such as additional practice, lesson redirecting, reteaching, and using alternative teaching strategies or approaches (Boston, 2002). More specifically, within the last few decades, formative assessment has been utilized to address a more student-centered classroom that can allow for immediate feedback as well as instantaneous redirection for the instructor (Nicol & Macfarlane-Dick, 2006). In addition, formative assessments such as Angelo and Cross's CATs can be viewed as a way to empower students to become more self-regulated learners (Nicol & Macfarlane-Dick, 2006).

## FORMATIVE ASSESSMENT IN THE ONLINE CLASSROOM

As formative assessments have been deemed useful within the traditional classroom, there has been little examination of how this form of evaluation can be used in online learning modalities (Clark, 2012). Learning using an online modality has allowed for "the reformation and modernization of roles for both the teacher and learner as well as the transformation of relationships and practices within the classroom" (Vonderwell & Boboc, 2013). In order to best foster these changes in education, there is a need for the use of innovative teaching strategies that provide a meaningful feedback loop between the instruction and assessment (Angelo & Cross, 1993). This connection can occur from the use of formative assessment, as this will provide instructors with specific data helping to identify and explain learning needs and areas in which to improve instruction (Vonderwell & Boboc, 2013). As stated by Vonderwell (2004), online education has specific needs because "understanding and evaluating student learning becomes essential specifically when students and instructors cannot see each other" (p. 29). It is clear that online classes have the need for formative assessments and CATs help meet this need.

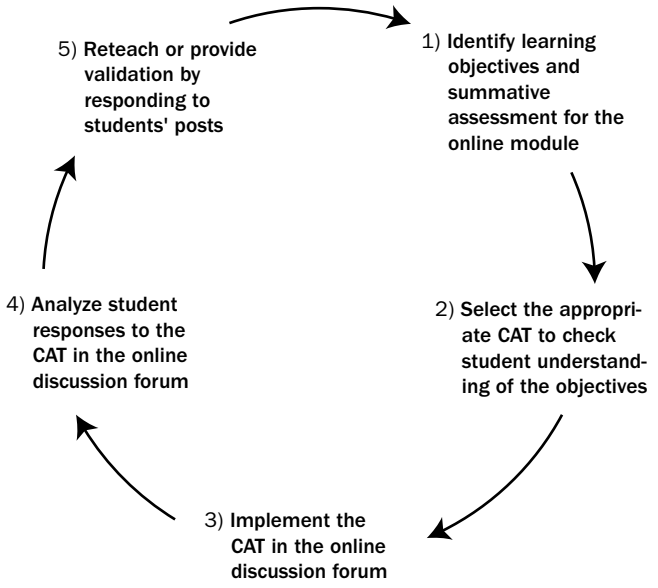
## CONCEPTUAL MODEL OF CATS IN THE ONLINE CLASSROOM

Classroom Assessment Techniques can open the channels of communication between the instructor and student, and they allow for a friendly tone within the online classroom. Expressing a voice that is accurately interpreted can be a challenge when individuals are not face to face. A common concern with online education for both learners and instructors is the lack of teacher presence (Ragan, n.d.). Many students imagine simply reading the text and completing the assignments with little to no interaction from the teacher. In fact, many online courses exist with this set up. However, formative assessments such as CATs allow for personalization in teaching and learning that can create "a friendly online learning environment to minimize existence of transactional distance" (Vonderwell, 2004, p. 31). CATs meet the need of adding extra instructor presence in the online classroom.

In addition, using CATs assists online students that may be low achieving or struggling with course content. Formative assessment in the online

classroom notifies both teachers and learners of gaps that may exist in current knowledge (Boston, 2002). Because of the above elements, the use of formative assessments such as CATs has begun to be successfully implemented in asynchronous online classrooms with positive results (Henderson, 2001). In Henderson's (2001) study, the discussion forum was used to check for student understanding for each topic. The findings showed that students were more quickly redirected or received affirmation of achieved learning goals. As the use of CATs in the online classroom is in the developmental phase, to best foster the new roles that this modality has brought to the world of academia, a conceptual model will be introduced that will help online instructors use this type of formative assessment in the online classroom. Figure 1 below depicts the proposed conceptual model of Classroom Assessment Techniques for the online classroom.

*Figure 1: Conceptual model of Classroom Assessment Techniques for the online classroom.*




CATs can be used effectively in online classes. The proposed conceptual model for CATs in the online classroom consists of a five-step process. Each phase of this model is important to the formative assessment process and in student learning and instructional delivery (Angelo & Cross, 1993). These steps have been designed and modified to meet the needs of an online classroom.

## STEP 1: IDENTIFYING THE OBJECTIVES

The first step of the implementation of CATs into the online classroom is identifying the weekly objectives as well as the summative assessment. In many online classrooms, one or more assignments are due at the end of the week. CATs are enacted to check for student understanding prior to attempting the summative assessment or assignments.

Phase 1 of CATs implementation is construction of the CAT by identifying what objectives need to be mastered for the module. Many of the CATs that are presented by Angelo and Cross (1993) can be easily adapted to the online classroom, such as the Minute Paper, the Misconception/Misperception Check, or the Muddiest Point. Instructors must look at the desired outcome and objective for each week of the class to find what is most appropriate.

## STEP 2: CHOOSING THE APPROPRIATE CAT

To choose the appropriate CAT, an instructor must identify the "assessable" question that needs to be met by the student learners (Angelo & Cross, 1993). This will allow the instructor to choose the most effective CAT for the objectives that are being learned. Two areas of focus should be whether the student response will change the way the lesson is taught and whether the teacher feedback will assist the student learning process (Angelo & Cross, 1993). These two questions should inform the type of CAT that would be appropriate to help students master the particular objective(s). For example, if a topic asks students to evaluate the importance of professional dispositions in the field of teaching, Angelo and Cross's (1993) Directed Paraphrasing would be an appropriate selection to assess student understanding. This strategy would ask students to paraphrase what they have learned about professional dispositions in three to five sentences that would be posed to a specific audience. The student responses would show the level of their understanding as well as provide them with summarization and paraphrasing skills necessary for recalling important information for summative assessments that ask for an evaluation or application of a concept(s).

## STEP 3: IMPLEMENTING CATS IN THE ONLINE CLASSROOM

An extra discussion post can serve as a formative assessment for the weekly topic and objectives.

To implement CATs into the online classroom, the discussion forum can be used. An example of this could be the KWL strategy, which was developed by Carr and Ogle (1987) to demonstrate Knowledge Known, Knowledge Wanted, and Knowledge Learned. Based on the topic and objectives for the week, an extra post can be added at the beginning of the week to ask students what they already know about the topic and what they want to learn about the topic. Toward the end of the week, students can be asked what they learned about the topic and objectives. The responses of the students can be used to address any misunderstandings or to provide positive feedback for those who are on the right path.

Angelo and Cross (1993) recommended that the CAT be tested before it is used in the classroom. This can be done by having the teacher complete the CAT first and/or by having a colleague test the CAT. The purpose of this phase is to be sure that the CAT is easy for students to complete as well as to make sure the desired outcomes are gained.

### STEP 4: ANALYSIS OF STUDENT RESPONSES TO CATS

Instructors can check for student understanding of the objectives by analyzing student responses to the CATs. Each response must be viewed and checked for accuracy. This process allows instructors to get a quick understanding of whole class and individual learning before the summative assessments. As an example, if referencing the same Directed Paraphrasing example from Step 2, during the teacher analysis period, the instructor would review student summaries. The instructor would focus on misunderstandings or confusion. In the case that there is a high level of confusion, the instructor would develop either a whole class re-teach or small group interventions, depending on the ration of mastery and interpretation.

### STEP 5: PROVIDE DIRECTED FEEDBACK FOR TEACHING OR VALIDATING STUDENT UNDERSTANDING

In the online classroom, instructor responses and feedback are the catalyst for the teaching process (Ragan, n.d.). Instructor feedback in the CATs will provide students with either direction if they misunderstand the topic or objectives or verification if they are on the right track. Instructor responses are critical to close the loop in the CAT process (Angelo & Cross, 1993).

Analysis of the effectiveness of CATs is an ongoing process (Angelo & Cross, 1993). Student responses must be interpreted by the instructor and then feedback must be formulated that will support the desired learning outcomes (Angelo & Cross, 1993). Angelo and Cross (1993) suggested that the results of the CAT are shared with the students. Next, the effectiveness of the CAT should be evaluated for success in the teaching and learning process. This provides the opportunity for data driven instruction in the online modality.

Future use of the CATs should be based on the efficacy of the process as well as the individual characteristics of a particular class. As all students learn differently and all classes have a different dynamic, the analysis of the CATs can be used to monitor and adjust the teaching and learning process.

## DISCUSSION

In the authors' experiences as scholars and instructors in the online environment, online classes are commonly formatted with forums to house participation and interactions that can mimic discussions that would be held in a traditional classroom setting. The discussion forums are viewable to all members of the class, both instructor and student. The number of discussion questions can vary, but they usually consist of two to three questions per week. On top of discussion forums, other elements are frequently found in the online modality such as weekly assignments and/or quizzes due at the completion of each module. The assignments and quizzes represent the form of summative assessments for the week or module. Due to the accelerated nature of some online classrooms, it is essential that students obtain a solid grasp of weekly concepts prior to completing summative assessments. However, gaps in the teaching and learning cycle can cause students to approach the summative assessment without fully mastering the objectives. CATs can fill these gaps (Angelo & Cross, 1993).

CATs can be added to the weekly modules of an online classroom easily. CATs allow the students an opportunity to address the objectives before the summative assessment as well as provide the opportunity for the instructor to check for understanding. As instructors review student responses, students receive additional feedback opportunities. Black and William (1998) explained that feedback is beneficial for student learning and growth. In

using CATs, instructors can monitor student responses and provide feedback to redirect or offer affirmation of student understanding.

## CONCLUSION

CATs come in a variety of different forms. Angelo and Cross (1993) have identified many. Several of these methods can be implemented in the online classroom and are beneficial for increasing student participation and helping them to better understand the objective before beginning the assignment or quiz (summative assessment).

As there is little literature regarding CATs in the online modality, research in this area is needed. Specifically, the effectiveness of CATs in increasing student learning outcomes would be useful. Specific CATs, such as the Background Knowledge Probe, Double-Entry Journals, the Muddiest Point, and the Minute Paper, should be studied along with other CATs to examine their effectiveness toward increasing student learning in the online environment (Angelo & Cross, 1993).

Innovation in strategies and techniques for both the online learner and instructor has assisted online classroom instruction in making educational strides. In turn, online education has become a popular instructional modality for many students. Due to this increase in popularity, it is essential that best classroom practices are researched, examined, and modified to meet the needs of the online learner.

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