

TITLE: Using Cloud-Based Collaborative Resources to Perform Continuous Formative Assessment (CFA)

TOPIC: Educational Technology

PRESENTATION FORMAT: Workshop

DESCRIPTION: Workshop participants will learn how to use free cloud-based collaborative online documents to perform continuous formative assessments of student understanding during instruction.

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Using Cloud-Based Collaborative Resources to Conduct Continuous Formative Assessment

Abstract:

Workshop participants will learn how to use free cloud-based collaborative online documents to perform continuous formative assessments of student understanding during instruction.

The need for better formative assessment

Schools and universities have been encouraged to develop a “culture of assessment” to provide evidence on the effectiveness of instructional programs (Weiner, 2009).

Although our “culture of assessment” has produced a wealth of literature, legislation, initiatives, reforms, and professional development, the vast majority has focused on assessment *of* learning (summative assessment) rather than assessment *for* learning (formative assessment). Formative assessment has been defined as “a process used by teachers and students during instruction that provides feedback to adjust ongoing teaching and learning to improve students’ achievement of intended instructional outcomes” (Popham, 2008). “What makes formative assessment formative is that it is immediately used to make adjustments so as to form new learning” (Shepard 2005).

Formative assessment is not a new concept, and any teacher that adjusts his or her teaching during instruction on the basis of evidence of student understanding and performance is employing formative assessment. Most teachers would agree that formative assessment is very important, but how does one accurately assess student comprehension and performance during a science class session?

Educators have adopted a variety of techniques to perform formative assessments. A group of physics educators introduced the modeling method for physics instruction in which students diagram physics problems on miniature whiteboards and hold them up for their teacher and peers to critique (Wells et. Al, 1995). Others advocate quick-writes (Rief, 2002; Clidas, 2010), science notebooks (Clidas, 2010; Roberson, 2010), and the use of audience response systems (Kay et. Al., 2009). All these techniques have their merits and provide opportunities for teachers to check for understanding and adjust their instruction accordingly, but all have significant limitations. The modeling technique is excellent, but once students erase their boards, the record of their understanding vanishes. Quick-writes and science notebooks provide a log of student understanding and performance, but it is not possible for teachers to see all quick-writes or notebooks as they are written, and therefore any adjustment to instruction is postponed until the subsequent day. Audience response systems have the advantage of providing immediate feedback, but student input is generally limited to true/false and multiple-choice responses. If science teachers are to adjust instruction to meet student needs, they must collect and analyze student responses as they are made. Fortunately, synchronous collaborative documents provide opportunity to do just that.

Continuous Formative Assessments (CFA) in science instruction

The authors have developed a teaching technique that employs synchronous collaborative web-based documents to perform continuous, real-time formative assessments of student understanding so that science teachers can adjust their instruction to address the immediate needs of their students. The technique provided in this workshop has the potential to engage *all* learners *all* of the time as they provide feedback, data, quick-writes and analyses in response to instructor prompts. Using our model, teachers have the opportunity to observe all student contributions as they are made.

Our continuous formative assessment (CFA) model has been made possible by the development of free collaborative web-based spreadsheets, documents, presentations, and drawings (Herr et. al., 2010a,b; 2011a,b, 2012). Using the CFA model, teachers develop online documents and share editing privileges with their students. Teachers provide prompts to which students simultaneously respond on the same document. For example, using an online spreadsheet, teachers enter student names in column one and pose a question in the header of column two. The cells in column two become highlighted when students start to enter their responses, providing the teacher with information regarding which students are composing answers and which need more time. Once the teacher has determined that there has been a sufficient response, he or she asks students to press the “enter” key, and instantly the cells are populated with student responses. Color-coding and roll-over names identify those who have made contributions and deters students from entering data in cells other than their own.

As the students enter their responses, teachers scan the developing response table to assess student understanding and adjust instruction accordingly. For example, if few students provide an adequate written response, a teacher may pose a new question in a simpler format such as multiple-choice. By programming the spreadsheet appropriately,

the teacher obtains statistical data to indicate the percentages of students that understand or have specific misconceptions. The teacher freezes the name column (row header) and the question row (column header) and opens a new column next to student names. This insures that each current response is adjacent to the student's name while simultaneously storing previous responses in columns to the right. The teacher opens a new worksheet for each day and tracks student performance and understanding by tabbing through worksheets from previous lessons.

Preliminary data suggests that the CFA model using collaborative documents to make formative assessments significantly enhances student engagement and understanding. Professors who have used this model in teacher preparation programs report greater student engagement in lessons and greater personal satisfaction with assessments of student progress. Bandura (1997) and Zimmerman (2002) suggest that formative assessments permit students to express themselves and develop a sense of self-efficacy, a key requirement for the development of autonomous learning strategies. Polanyi (1967), Schön (1987), and Rogoff (2001) emphasize the formative and reflective purpose of student discourse and encourage an open community of learners where ideas and opinions are exchanged so that students can co-construct their understanding. The CFA model provides an environment where such discourse can take place, but unlike a traditional science classroom where certain students dominate, all students are on an equal footing since all have access to the same document for their contributions. In this session we provide hands-on experience with the CFA approach to using collaborative online documents to enable continuous formative assessment.

Value of workshop activities

New collaborative web-based document technology provides the opportunity to instantly collect and analyze large sets of data from multiple students, groups and class sections with speed and accuracy. Teachers can learn to use tools like Google Docs & Sites to turn traditional classroom activities into student-centered inquiry and discussion. CFA helps teachers create a classroom environment that mirrors the collaborative environment of a professional learning community. Teachers will create classroom activities in which students analyze whole-class data using wikis and collaborative spreadsheets, and work with peers to reach consensus and produce collaborative reports on their conclusions. These activities help students gain an understanding that the learning enterprise requires collaboration, independent verification, and peer review. In this workshop, participants are introduced to a range of collaborative web-based activities in which they continuously monitor student ideas and input so that they can adjust their instruction to meet student needs. Those who participate in this workshop will leave with an ability to use free cloud-based collaborative tools to perform continuous formative assessments of their students so that they can adjust their instruction accordingly.

Workshop Activities -

During this ninety minute workshop, participants will learn how to use the CFA model by participating first as a student and then as the instructor. We will use collaborative documents to collect data from various inquiry activities. Participants will then analyze the entire data set collaboratively. We will discuss the best practices of collaborative

inquiry as well as professional development strategies. We will conclude by having participants brainstorm ways the CFA model can be used to help teachers improve formative assessment of all learning activities.

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