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Using Classroom Assessment Techniques to Improve Student Learning in Accounting Classes

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ABSTRACT: Accounting professors typically hold two views of assessment. One focuses on large-scale efforts encouraged by administrators to assess students at key points in their accounting program using instruments such as surveys, achievement tests and focus groups. The other focuses on efforts by professors to assess learning within their classes using written assignments, examinations and discussions with students during class and office hours. This paper expands the view of assessment to include Classroom Assessment Techniques (CATs). To this end, we make three contributions. First, we compare CATs to other forms of assessment so professors can decide whether CATs make sense for their classes. Second, we bring together the accounting education literature to suggest CATs that are well suited for accounting. We provide a summary table, examples and suggestions for using these CATs to improve student learning. Third, we highlight how well CATs fit with recent developments to improve accounting education.

Mention the word “assessment” and you’ll typically trigger thoughts of large-scale efforts that use surveys, achievement tests, focus groups and other procedures developed by measurement experts, to assess students at key points in their accounting program. But assessment can go beyond those large-scale efforts, referred to as outcomes assessment (Herring and Izard 1992) or program-level assessment (Gainen and Locatelli 1995), to include small-scale assessment techniques used by professors during their classes, referred to as classroom assessment (Cross 1989). The purpose of this paper is to introduce several promising Classroom Assessment Techniques (CATs) and

suggest how they can be used, individually or together, to improve student learning in accounting classes.

CATs are techniques such as questionnaires and short, ungraded exercises designed specifically to find out what students know. Professors need not be measurement experts to

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prepare CATs since over 50 have been developed and are included in Angelo and Cross (1993). Yet CATs are defined not only by what they look like, but by how they are used. CATs are never graded, since the professor and students are to focus on finding out what students know rather than on assigning points. CATs are typically anonymous to encourage students to respond, and to do so honestly. CATs also create an ongoing student-professor feedback loop (Angelo and Cross 1993). The professor closes the feedback loop by telling students not only what the CAT said about their learning, but what the professor and students can do to improve it. The process is ongoing because making changes naturally brings up a need to assess again.

Typically, professors assess student learning by using evaluative techniques such as written assignments and examinations, or by talking with select students during class and office hours. CATs offer a valuable supplement to these methods because they provide an assessment that is potentially more timely and comprehensive. Many professors have experienced the frustration of giving an exam or collecting an assignment after a topic was covered, only to find out then that students didn't learn the material. Because CATs are used regularly, timely feedback can be collected to help the professor avoid such surprises. This timely feedback gives the professor greater discretion over when and how to make changes to improve learning. Because CATs are administered to the entire class, they likely result in a more comprehensive view of the level and dispersion of the group's learning at a point in time. This helps the professor to avoid making sweep-

ing generalizations or assumptions about students' learning needs based on too few observations.

Professors who want to use CATs need to decide how and when to use them. In this paper, we discuss how accounting professors can introduce CATs to their classes. We bring together the accounting education literature on the subject, suggesting four CATs that are particularly well suited for accounting classes. We provide examples of each and suggestions for how to use them, individually or together, to improve student learning. We conclude with examples demonstrating how well CATs fit with recent developments in accounting education.

INTRODUCING CATs TO ACCOUNTING CLASSES

Professors use CATs to improve student learning, fully anticipating that they will make changes to their classes as a result.¹ However, CATs go beyond this, directly affecting the student as well. Angelo and Cross (1993, 4) suggest that the regular feedback students receive from CATs can help them become "more effective, self-assessing, self-directed learners." For this to happen, students need to be aware of what CATs are, why the professor is using them, and how they work.

There are two ways to increase students' awareness of CATs. The first is to talk with them at the beginning of the class term and periodically when

¹ This is not to say making changes is easy. In fact, many professors suggest they face difficult questions about how to adjust course coverage to improve student learning because of the feedback they receive from a CAT (Angelo 1991). While these decisions will always be difficult, it is likely that if the professor did not use a CAT the problem would still exist, the professor just wouldn't know about it.

CATs are used. The second is to include some description of assessment in the course syllabus as the following excerpt illustrates.

Classroom Assessment

From time to time I will utilize Classroom Assessment Techniques (CATs) to ask you about how the class is going or about your understanding of the course material. These CATs are ungraded. I will, however, provide you with feedback about the results. In addition, the class will elect two students to serve on a quality control circle (QCC) with which I will meet on a frequent basis during the semester. The purpose of the QCC is to empower students in their own education and to give me feedback on how the class is going. I frequently make changes and adjustments to the class based on my meetings with the QCC. I encourage all students to contact QCC members with comments or concerns about the class. Members of the QCC will be instructed not to reveal the names of students who contact them about class concerns.

Including discussion in the syllabus works well for professors who feel comfortable using CATs and plan to use them over the entire class term. This comfort typically comes from, as Angelo and Cross (1993) suggest, starting small. To get started in classroom assessment, they recommend using an "easy" CAT, such as the Minute Paper.

The Minute Paper, the most popular and frequently used CAT (Angelo and Cross 1993), was first described by a physics professor whose students strongly agreed with the statement "knows if the class is understanding him/her or not" (Wilson 1986). To use

a Minute Paper, the professor stops class early and asks students to answer two questions:

1. What was the most important thing you learned today?
2. What question do you still have at the end of class today?

After class, the professor summarizes student responses and reports to students at the next class meeting. The professor lists the things most students found to be important and, if students are off track, revisits important topics. The most frequently asked and/or most interesting questions are also discussed in class.

The Minute Paper got its name since the professor typically allocates a minute or so at the end of class to complete it. The total time required of the professor, however, includes preparation time, analysis time, and reporting time, with the bulk of the time typically spent in analyzing the feedback received from the CAT. While the time commitment varies depending on which CAT a professor chooses, Angelo and Cross (1993) suggest professors plan for one minute per response per student to analyze student responses.

To assess different aspects of student learning and/or to combat potential "burn out" from using one technique too often, professors may decide to use a portfolio of CATs in their classes. There are two ways to determine which CATs to include in the portfolio. One is to complete a Teaching Goals Inventory (Angelo and Cross 1993) to rank six specific teaching goals: (1) higher-order thinking skills, (2) basic academic success skills, (3) discipline-specific knowledge and skills, (4) liberal arts and academic values, (5) work and career preparation, and (6) personal

development. The professor then selects CATs that match important teaching goals. This approach provides a generic way for professors, in any discipline, to find CATs that suit their needs.

Because teaching goals may be somewhat homogeneous within a specific discipline, such as accounting, the education literature provides a second resource for selecting CATs. Several accounting professors have reported on their use of individual CATs (Cottell 1991; Beard 1993; Cohen and Kugel 1994; Cottell and Harwood 1996; Harwood 1998) and a portfolio of CATs (Cottell 1991; Beard 1993; Cottell and Harwood 1998; Cottell and Millis 1998).² The techniques used can be brought together in one portfolio of four CATs.³ Table 1 provides an overview of four CATs that work well for accounting classes along with their purpose and suggested use.

Feedback Form

The Feedback Form is a CAT based on the Minute Paper but extended in three important ways (Harwood 1998). First, Feedback Forms are preprinted, while Minute Papers generally are not. A preprinted form gives students the sense that the CAT was planned and is to be taken seriously, and facilitates the professor's analysis of the information. Second, students are encouraged to sign their names so that the professor can answer each question even if it wasn't the most interesting or frequently asked. This helps achieve closure for every student, which can be difficult when using CATs (Angleo 1991). Third, as panels A through C of figure 1 demonstrate, the second question is varied. This provides the professor the op-

portunity to use several different CATs within the context of the same form. The professor assesses student learning of each topic throughout the course by choosing the most appropriate CAT for that topic and incorporating it into the Feedback Form as the second question.⁴ Students can develop a routine of using CATs, but avoid potential "burn out" from using one technique too often.

Panel A provides a sample Feedback Form with a Directed Paraphrasing as the second question. The Directed Paraphrasing requires students

² Much of the support for CATs in the literature has been based on anecdotal evidence and professors' perceptions. More extensive empirical research on the effectiveness of CATs is needed, although two studies have produced some interesting initial results (Harwood 1998; Cottell and Harwood 1998). Harwood (1998) measured student perceptions and found evidence that students who routinely used Feedback Forms (discussed below) provided information to the professor that they would not have otherwise. She did not find significant "burn out" effects from using Feedback Forms at each and every class meeting. When Cottell and Harwood (1998) used a variety of CATs without the structure and routine of the Feedback Form, they found that students in classes using CATs did not learn more than students in control classes. They suggested that future research should focus more on the process of classroom assessment, particularly tracking what students do when they get feedback from CATs. Taken together, these studies provide basis for the suggestion in this paper that professors who want to use a variety of CATs during the course should use the structure of the Feedback Form to do so.

³ The Diagnostic Learning Log, a version of an academic journal used by Cottell (1991), is not included in the portfolio. A modified version of the log could be used together with a Feedback Form (discussed below), but if other CATs are being introduced through Feedback Forms, the "feel" of the academic journal will likely be lost.

⁴ For example, by including the second question "What was the most important thing you learned today?" the Feedback Form becomes a Minute Paper.

TABLE 1
A Portfolio of CATs Useful for Accounting Courses

<u>CAT</u>	<u>Purpose</u>	<u>Suggested Use</u>
Feedback Form	A standardized two-part form. The first part identifies student questions. The second part assesses student learning using an appropriate CAT for the topic.	Use once for each topic covered in the class. Although CATs are typically anonymous, when students identify themselves the professor can answer every question without taking class time. CATs for the second part can be easily adapted from Angelo and Cross (1993) (e.g., Minute Paper, Directed Paraphrasing, Pro and Con Grid, Background Knowledge Probe).
Background Knowledge Probe	To assess prior knowledge and preconceptions.	Useful for the first class to increase student awareness of their knowledge and help the professor plan an effective approach to course material. Can be combined with Documented Problem Solutions (Beard 1993) or Goals Ranking and Matching (Angelo and Cross 1993). When used in groups serves as a good icebreaker. When repeated on the last class, can be used to demonstrate to students what they learned.
Quality Control Circle	To provide a liaison between students and the professor.	This is an ongoing CAT used throughout the semester. Students contact QCC members with feedback about the course that is passed on to the professor. Several scheduled meetings during the semester increase the effectiveness of the QCC. The QCC can design, analyze and report on a mid-semester evaluation, a.k.a. Group Instructional Feedback Technique (Angelo and Cross 1993).

(Continued on next page)

TABLE 1 (Continued)

CAT	Purpose	Suggested Use
Group Work Evaluation Form	To assess the effectiveness of group work both in and out of class.	Best used more than once with the professor reporting any changes in behavior. By asking students to identify their groups, the professor can follow up on groups reporting problems.

to explain a concept or procedure to an audience chosen by the professor. In so doing, the professor may reinforce not only understanding of the concepts, but the "real world" relevance as well.

Panel B provides a sample Feedback Form with a Pro and Con Grid as the second question. This question encourages students to consider both sides of an issue and can help develop their awareness of alternative solutions to a problem.

Panel C provides a sample Feedback Form completed by a student in an Introductory Financial Accounting class.⁵ While she had a question about unearned revenue that is fairly predictable for a beginning student, notice that she prepared a correct journal entry in panel C, part 2c. The Feedback Form is encouraging the student to self-assess, a benefit suggested by Angelo and Cross (1993). At the next class meeting, the professor returned the Feedback Form with a brief answer to her question and a note "try again" alongside her entry in panel C, part 2a. In class, the professor reported the percentage of students that correctly prepared each entry. The professor also encouraged those who saw "try again" next to an entry to do so, offering to check the form once more.⁶ This professor opted to use out-of-class time to resolve incorrect responses,

but could have chosen to go over the entries in class instead.

Background Knowledge Probe

The Background Knowledge Probe is a questionnaire designed to find out the knowledge students bring to a class. Knowing what students know before we start teaching can increase teaching efficiency and effectiveness. Teaching efficiency increases when we discover that students know something we thought they didn't and we now have time to cover other material. Teaching effectiveness increases when we target the learning needs, both in terms of coverage and level, of each class (Angelo and Cross 1993). Students benefit not only from the adjustments the professor makes, but an increased awareness of what they need to learn. Using the Background Knowledge Probe on the first and last day can demonstrate to students how much they learned in the class (Cottell and Harwood 1996). Figure 2 contains two examples of Background Knowledge Probes. The first, in panel A, was used on the first day. The second, in panel B, was combined with a Feedback Form to help determine class coverage of upcoming owners' equity issues.

⁵ The student signed the form, but the name has been withheld.

⁶ This student did "try again" and turned in correct entries at the next class.

FIGURE 1
Sample Feedback Forms

Panel A: Sample Feedback Form with Second Question as a Directed Paraphrasing

Feedback Form

Intermediate Accounting

Name: _____
Class: ___ 1:00 ___ 2:00

1. I have the following question relating to:
- _____ Text Material (Page/Section _____)
 _____ Lecture Material and Class Discussion
 _____ Problem Material (Which one? _____)

My question is:

_____ I don't have a question today—I'm all set.

2. Your company is considering adopting a defined benefit pension plan to replace its current defined contribution plan. The CEO has called you and is anxiously awaiting your return phone call. Before his meeting he needs an answer to the following question: "What will this change do to Pension Expense on our Income Statement?"

You have a couple of minutes to organize your answer to the CEO. In a few sentences, clearly explain the computation of pension expense for a defined benefit pension plan.

Panel B: Sample Feedback Form with Second Question as a Pro and Con Grid

Feedback Form

Financial Accounting

Name: _____
Class: ___ 1:00 ___ 2:00

1. I have the following question relating to:
- _____ Text Material (Page/Section _____)
 _____ Lecture Material and Class Discussion
 _____ Problem Material (Which one? _____)

My question is:

_____ I don't have a question today—I'm all set.

2. From the perspective of a chief financial officer of a corporation and considering everything you know about debt financing at this point, what do you see as the most important pros and cons, or benefits and costs, of a company financing with debt as opposed to equity? List at least two pros and two cons below.

(Continued on next page)

FIGURE 1 (Continued)

Panel C: Sample Feedback Form with Student Responses in Italics^a

Feedback Form
September 12, 1997

Financial Accounting

Name: _____
Class: ___ 1:00 2:00

1. I have the following question relating to:
- _____ Text Material (Page/Section _____)
 _____ Lecture Material and Class Discussion
 _____ Problem Material (Which one? _____)

My question is:

*I'm still questioning why earned revenue is a listable liability,
but otherwise...*

I don't have a question today—I'm all set.

2. Prepare journal entries for Axel Inc. for the following transactions. If the transaction does not require a journal entry, write "NO ENTRY NEEDED."
- a. Purchased a delivery truck for \$10,000; paid \$5,000 cash and borrowed the remainder from the bank, signing a note payable.

<i>Inventory</i>	<i>10,000</i>		
<i>Notes Payable</i>	<i>5,000</i>		
<i>Cash</i>			<i>5,000</i>

- b. A stockholder sold \$5,000 of his capital stock in Axel Inc. to his neighbor.

"No entry needed"

- c. Received \$250 cash from a customer, Mr. Harold, for services to be provided at the beginning of next year.

<i>Cash</i>	<i>250</i>		
	<i>Unearned Revenue</i>		<i>250</i>

^a Source: Libby et al. (1996, 95).

Quality Control Circle (Classroom Assessment Quality Circle)

The Quality Control Circle (QCC) provides a liaison between students and the professor (Angelo and Cross 1993). Several students, typically 2–5, are chosen by the professor or elected by their peers. Students often feel more comfortable talking with their elected members rather

than with those the professor chose. The QCC meets periodically with the professor to discuss things in the class that could be changed to improve student learning. Because the suggestions, complaints and/or compliments the QCC brings to the professor are likely to be sensitive, the professor and the QCC members should agree to protect the

FIGURE 2
Sample Background Knowledge Probes

Panel A: Sample Background Knowledge Probe

An Introduction to Accounting, First Day Class Discussion

The objective for this first class meeting is to measure your thoughts and opinions about accounting. Please take 10 minutes to provide your own HONEST answers to the following questions.

1. Complete the following sentence with the first thing that comes to mind.
Accounting is _____.
2. Describe a typical accountant.
3. What does an accountant do? What skills are necessary to be an accountant?
4. What do companies do?
5. Why do companies prepare financial statements and accounting information?
6. How exact is accounting information (or how much flexibility do companies have when it comes to accounting)? Who decides how accounting information is to be prepared (i.e., the "rules," if there are any)?
7. Assume you have some money to invest in the stock market. You're thinking about investing in Coca-Cola and/or PepsiCo. Which company do you think you'd invest in? Why?

What additional information would you like to have to be more comfortable with your investment decision?

Now, meet with your group for 15 minutes to discuss these questions and summarize the group's responses.

Keep this form with your class notes. We will revisit it during the last week of classes.

Panel B: Feedback Form with Second Question as a Background Knowledge Probe

Financial Accounting

Name: _____

Class: ___ 1:00 ___ 2:00

1. I have the following question relating to:
 _____ Text Material (Page/Section _____)
 _____ Lecture Material and Class Discussion
 _____ Problem Material (Which one? _____)

(Continued on next page)

FIGURE 2 (Continued)

My question is:

_____ I don't have a question today—I'm all set.

2. Next time, we will start talking about Owners' Equity. I'd like to know what you know about Owners' Equity before class, so that we can make the best use of class time. Please check all of the following topics you are comfortable with at this point.

_____ How sole proprietorships, partnerships, and corporations differ.

_____ The advantages of the corporate form.

_____ What common stock is.

_____ The rights of common stockholders.

_____ What preferred stock is.

_____ What par value means.

_____ The difference between authorized, issued and outstanding shares.

_____ The three dates that are important when a company decides to pay a dividend.

confidentiality of students who provided the information. Students serving on the QCC can benefit by becoming more active participants in the learning process (Cottell 1991; Angelo and Cross 1993; Cohen and Kugel 1994).

Professors can use the QCC to administer a mid-semester evaluation such as the Group Instructional Feedback Technique (Angelo and Cross 1993, 335). The QCC can not only administer the evaluation and analyze responses, but design the form as well. An adaption of the mid-semester evaluation is illustrated in figure 3. Notice that the questions ask what both the student and professor do to help and hinder learning and what both could do to improve it.

Group Work Evaluation Form

With the increased focus on group assignments both in and out of class, professors search for ways to be sure that the group experience is valuable and productive. Using a Group Work Evaluation Form (Angelo and Cross 1993, 350), such as the sample included as figure 4, a few times during the semester can identify problems such as free-riders or ill-prepared group members. The last three questions help shift students' attitude toward their contribution to the group and what they are getting from the experience. By asking students to identify their group, but not themselves, the professor can observe the cohesiveness and effectiveness of each group and follow up as appropriate (Angelo and Cross 1993).

FIGURE 3
Sample Group Instructional Feedback Technique^a

Mid-Semester Evaluation

Please write brief, honest and legible answers to the following questions. Please do NOT write your name on this form. *Return this form directly to the Quality Control Committee Representative.*

1. What are one or two specific things that *you* do that **help you learn** in this course?

What are one or two specific things that the *Professor* does that **help you learn** in this course?

2. What are one or two specific things that *you* do that interfere with or **hinder your learning** in this course?

What are one or two specific things that the *Professor* does that interfere with or **hinder your learning** in this course?

3. Please suggest one or two specific things that *you* could do to help you improve the quality of your learning in this course.

Please suggest one or two specific things that the *Professor* could do to help you improve the quality of your learning in this course.

^a Source: Angelo and Cross (1993, 335).

The four CATs suggested in this paper could be used individually or together to improve student learning in accounting classes. Evaluating them individually, the Feedback Form provides the most potential for professors because it gives them the flexibility to use a variety of assessment approaches in their classes. Each professor must choose the assessment approach that best fits his or her teaching style and the nature of the course.

CONCLUDING REMARKS

Recent years represent a period of significant change in accounting education. We've changed course content and instructional methods, with the guidance of the Accounting Education Change Commission (AECC 1990), to promote "life-long learning" in students. We've developed and refined assessment programs that not only check on curricular changes, but meet AACSB mandates as well. CATs fit well with these

FIGURE 4
Sample Group Work Evaluation Form^a

Group Work Evaluation Form
Progress Report #1

Group Number: _____
Class: ___ 1:00 ___ 2:00

1. How many members are in your group?

Four	Five	Six
------	------	-----

2. Of these group members, how many participated actively most of the time?

One	Two	Three	Four	Five	Six
-----	-----	-------	------	------	-----

3. Of these group members, how many were fully prepared for meetings?

One	Two	Three	Four	Five	Six
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4. Overall, how effectively did your group work together on this assignment?

Poorly	Adequately	Well	Very Well	Extremely Well
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5. Give a specific example of something you learned from the group that you probably would not have learned by working alone.

6. Give a specific example of something the other group members learned from you that they probably wouldn't have learned otherwise.

7. Suggest one change the group could make to improve its performance.

^a Source: Angelo and Cross (1993, 350).

recent developments in accounting education.

CATs are consistent with AECC objectives and changes to accounting programs that meet those objectives. By using CATs, students can develop important life-long learning skills. For example, a student may be encouraged to self-assess by asking a question on a Feedback Form about something she can memorize, but not understand.⁷ Professors can use

CATs to get timely feedback to help them assess changes in course coverage and/or teaching approaches. CATs can identify the level of and dispersion in groups' learning and their reaction to the learning experience as well. For example, assume a professor adds an in-class group exercise on depreciation methods. If the professor wants to make sure each student

⁷ Refer to figure 1, panel C for an example.

learned the technical material, he can design a Feedback Form that includes a short depreciation calculation. If the professor is concerned about group dynamics as well, he can use a Group Work Evaluation Form or include another question on the Feedback Form to find out if changes are needed to improve the group experience.

Adding CATs to accounting classes is consistent with the development and refinement of a formal assessment program. CATs can be particularly helpful in closing the feedback loop, a current area of emphasis of the AACSB (Williams 1997). For example, suppose juniors who take an achievement test have difficulty computing and understanding income from continuing operations. CATs can help identify the magnitude of the problem and/or enlist pro-

fessors to make necessary changes on a class-by-class basis. Introductory Financial Accounting professors could use a Feedback Form with a Directed Paraphrasing asking students to explain what income from continuing operations is to a friend who has called them for investment advice. Intermediate Accounting professors could use a Background Knowledge Probe on the first class day to see how well students can compute income from continuing operations and a Feedback Form later on in the course to see whether students have mastered the computation and interpretation. This example illustrates that while CATs are different from program-level assessment, they share, and can be used together to achieve, a common purpose—to improve what students learn in their accounting classes.

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