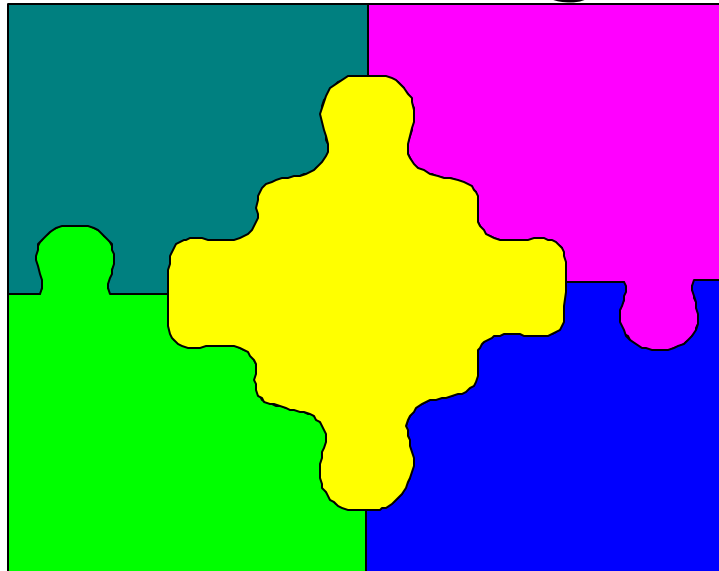


# **Using Classroom Assessment Data to Improve Student Learning**



**Center for Effective University Teaching  
&  
GE Master Teacher's Team**

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# Table of Contents

- Welcome.....3
- Introduction.....4
- Why do Assessment?.....5
- Things to Consider.....6
- Getting Started.....7
- Types of Classroom assessment activities.....8
- Analyzing and Feeding back data results.....13
- Reflection Memo.....16
- Conclusion.....17



*Welcome!*

Welcome to assessment! One of the most important responsibilities we have as teachers is to improve the learning of our students. As part of an ongoing initiative to assist faculty in Outcome Assessment efforts, we have designed this booklet to assist you in incorporating assessment activities into your course.

Assessment is valuable and challenging, it is also the key to unlock what has actually been learned! This booklet will take you through the steps, complete with examples, to implement classroom assessment activities into your course to enhance your students' educational experience. The index is set up so you can easily refer to the sections that will be most relevant to your course.

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## ***Introduction:***

Assessment is an on-going process whose goal is understanding and improving student learning. The more we know about students and their experiences during the learning process, the better we can meet learning needs and establish a positive learning environment. This booklet is designed to assist you in implementing an outcome based assessment model in your course that is simple, efficient, and beneficial to both the teacher and the learner.

Using an **Input/Experience/Output (I.E.O.)** model that is integrated into your course, you will be able to use the information from assessment activities to improve learning, adjust the curriculum and increase the effectiveness of your own teaching. In other words, the more you know about what knowledge, skill and attributes the students enter your class with (INPUT), how students are tackling the learning in your course (EXPERIENCE), and what knowledge, skills and attitudes they have at the end of the course (OUTPUT), the more effectively and efficiently you will teach and students will learn.

Remember, assessment is not an “add-on” but an integral part of the learning process. It is important that you have a clear understanding of what you want to assess and then be sure you communicate that understanding to your students. Assessment is a collaborative effort, it is not something “done to students” but rather something “done with students” in which they gain valuable information about their own learning.

## ***Why do assessment?***

There are many documented benefits in the literature for doing assessment: increased discourse over curriculum, increased energy and renewal about teaching, curriculum and program revision, improved faculty-student communication and improved student satisfaction. Assessment efforts have identified additional benefits for faculty, students and the department.

### ***Instructor Benefits:***

- Assessment efforts led to ongoing change in course content that increased student learning and satisfaction
- Improved individual teaching, monitoring student learning led to new and different ways of presenting material
- Provided positive re-enforcement for faculty. Knowing the amount of student learning on and on-going basis as opposed to end of the semester was rewarding for faculty
- Led to revision and change for course improvement in the future.

### ***Student Benefits:***

- Increased students' ability to self-assess their knowledge and skills
- Created a positive affect in the classroom. Students felt their faculty really cared about their learning
- Allowed them to study more efficiently and effectively, thus saving them valuable time
- Students reported it was FUN

### ***Departmental Benefits:***

- Increased discussion about teaching
- Led to new and innovative ways to teach

## ***Things to consider BEFORE you begin:***

While implementing assessment is valuable, there are a few things to think about *before* you begin the process. This is a change, for you and the students. As in any endeavor involving change there is resistance, so be prepared for it. Students often have concerns about why they are doing activities and it is **EXTREMELY IMPORTANT** to make students aware of what you are doing and why you are doing it. Helping them to see the value of doing assessment to improve their learning allows them to adjust to these new activities and to see the value in these exercises.

Finding assessment activities that are meaningful in the context of your course can be challenging. Assessment for assessment's sake is a waste of everyone's time. A systems approach to the whole course, while taking more time, is often more useful and effective than just adding one or two activities. But again, each faculty member must find the level of comfort and usability for their course.

Remember; as you add something to a course there are always time, energy, and tradeoffs. Until you and the students are comfortable with assessment there will be a tension between content and process. But the process of preparing for assessment often helps you identify the most important objectives for your course, and allows you to focus on those so that it is easier to find content areas that can be modified to accommodate assessment activities. At first, until you've designed activities, and are comfortable with the rhythm and flow of these activities in your course, it will take time and energy on your part. However, as in most changes, once you've become accustomed to it, you will develop efficient systems that may actually save you time. There are many tips and suggestions in this booklet to help you do assessment as efficiently as possible.

## ***Getting Started!***

There are many resources at Northeastern to help you get started on “doing classroom assessment.” The Center for Effective University Teaching has a large library of practical resources that can be adapted to any content area. The CEUT staff also has experience in incorporating Classroom Assessment Activities into a variety of disciplines and are available to consult with individuals and departments.

***The first rule is to begin small.*** While you might want to outline your current course assessments and plan a more comprehensive assessment, you can begin implementation in a small way.

## ***Classroom Assessment Activities***

There are two types of classroom assessment activities: formative and summative.

***Formative assessment*** refers to those activities that are used to improve student learning. They may be graded or ungraded, but they provide students with information that allows them to learn something about their own knowledge or skills, make a change, and ultimately improve their learning. These types of activities include quizzes, problem sets, concept quizzes, muddy point cards and so forth.

***Summative assessment*** measures are those which are graded and judge a student's ability. Though the student may use the information to improve future learning, there is no opportunity within your course to improve. Summative activities include final exams, final projects, portfolios, and critical design reviews.

Below is an explanation of some of the more useful formative classroom assessment techniques:

### **(I) IN-COMING ASSESSMENT**

- Gives baseline data about student knowledge and skills
- Allows tailoring of lectures to class needs
- Allows students to see value added at the end of the course

Passing out a brief questionnaire at the beginning and end of the course allows you to tailor classwork to students' needs and allows both faculty and students to visibly see the perceived benefits and gains in a course.

**Process:** Simple questionnaire asking a combination of the following:

- Demographic information
- Perception of students' understanding of previous knowledge and skills
- Pertinent past education
- Pertinent past working experience (sample in appendix)

## (E) ON-GOING EXPERIENCE ASSESSMENT

### 1. Turn-to-Your-Partner Activities

Turn-to-your-partner activities allow you to present situations that accomplish the following:

- Solve a problem
- Predict or explain what will happen in a novel situation
- Summarize key ideas of a lecture
- Reflect on material

#### Turn to your partner process:

- Form groups of two
- Work a given class problem individually (5 minutes)
- When instructed, explain your answer to your partner, then have partner explain his/her answer to you (4 minutes)
- Working together, synthesize the best answer possible (3 minutes)
- Either partner may be asked to brief solution (2 minutes)

### 2. Concept Tests

Concept tests are part of a process called *Peer Instruction* advocated by Mazur. This process:

- Allows continual feedback to both students and teacher on understanding of key concepts

#### Concept Test Process

- A simple conceptual question is posed with multiple choice answer (1 min)
- Silence: the students are given time to think (1 min)
- Students record their answers by holding up flashcards with the correct letter answers that face the teacher (1min).
- Chaos: the students are asked to “convince” their neighbors why their answer is correct (1 min)
- Students record their answers (optional)
- Feedback to instructor using flashcards again: Tally of answers (1 min)
- Explanation of answer to question (2+ min)

## *Example Concept Test*

### Buoyancy

Imagine holding two bricks under water. Brick A is just beneath the surface of the water, while brick B is at a greater depth. The force needed to hold brick B in place is

1. larger
2. the same as
3. smaller than

the force required to hold brick A in place.

### **3. Muddiest Part of the Lecture**

Muddiest part of the lecture is a quick assessment feedback mechanism that:

- Gives instant feedback to teacher
- Allows corrective action on next lecture
- Allows reflective time for students
- Is more effective than “are there any questions?”

#### **Muddy Part of the Lecture Process**

- Decide on question (what feedback?). You can ask them what’s unclear, what’s the most important point in the lecture etc.
- Clearly describe process to students, often passing out cards at the beginning of the lecture allows students to record their questions as they go
- Allow 5 minutes at end of lecture to finish cards
- Collect responses
- Respond to feedback at next class

### **4. Questioning**

In an effort to engage students in their own learning, faculty often construct a dialogue mode for their lectures. Through questioning we hope students will think about material, synthesize concepts and become actively involved in their learning.

**Tips for good questioning: to make questioning a successful assessment technique remember the following:**

- WAIT at least to the count of five before you respond or ask another question
- Probe and shift questions so that you understand student's deeper levels of thinking, not just the answer. Ask them to clarify their ideas, to support their answer, or to think "out of the box"
- Be careful not to stack questions. Multiple questions asked in rapid-fire order leaves students unclear about what question to answer and faculty unclear about whether a student knows the information or forgot the question.

## **5. Cold Calling**

Cold Calling is a method that allows you to:

- Quickly assess in real time the understanding of complex concepts
- Randomly assess general understanding, not just those who raise their hands

### **Cold Calling Process**

- Write every student's name on a 3 x 5 card
- At the beginning of class shuffle the deck and as you ask questions, pick a name and "cold call" that student.

A caution with this technique is to clearly explain the purpose of this procedure to students. They need to know that it is not a judgment of their ability, but rather a way to understand how they comprehend class material. Encourage students to attempt an answer when you cold call them. This will help you decide where the breakdown is in their thinking. Don't be afraid to model that you don't know every answer either and that it's perfectly acceptable to acknowledge that.

## 6. Reading Quizzes

Often students are responsible for materials prior to class. It is beneficial to the students to do the reading and for the instructor to know that the material has been read. It's also beneficial for the instructor to know how much of what was read was understood.

### **Reading Quiz Process:**

- assign outside class reading
- ask students to write a brief paragraph giving a concise version of the main point of the reading

Keep it short and simple; this should not be a time-consuming activity for students. Remember that students often don't fully comprehend outside reading and that's what you're trying to determine. Even a few sentences summing up the main points will allow you to determine if they "got it."

## ***Analyzing & Feeding Back Classroom Data:***

Below is a step by step guide to help you create a classroom assessment plan for your course that allows you to efficiently analyze any data gathered and then close the assessment loop by providing that information where it will most help improve learning.

### **Step 1: Creating a Comprehensive Plan**

Create a comprehensive plan of assessment in the form of a class matrix that lists the learning objectives and the measures you will use to determine if these objectives have been met. To reiterate, there are two types of classroom assessment. ***Formative assessment*** is any measurement tool whose goal is to improve learning. It is part of continuous feedback that allows you and your students to determine in a timely manner, progress toward the learning objectives. ***Summative assessment*** is any measurement tool whose goal is a judgment of student competency. It is the final assessment of a learning objective that does not allow students to have an opportunity to improve in that course.

Appendix 1 contains examples of formative and summative assessment tools.

For example...one of your learning objectives is that students will be able to evaluate and explain the basic functions, interdependencies, and constraints of integrated systems. You have a preliminary design exercise in which you feedback to students how well they're doing in this area. That is a formative assessment because students can use that information to improve their learning. At the end of the semester you have a critical design exercise in which students present their final project. That is a summative assessment because the information you feed

back to the student may help them in future learning, but does not provide them an opportunity to improve in this class.

Your class matrix would resemble something like this:

	<b>Course X</b>	
	<u>formative</u>	<u>summative</u>
Knowledge Objective 1	muddy point concept quiz	2 tests project
Knowledge Objective 2	cold calling muddy point	2 quizzes final exam
Skill Objective 1	peer feedback	project
Attitude Objective 1	self assessment	

This visual picture of the assessment design for the course will allow you to make informed choices about the type and amount of assessment you wish to do. For example, in the above, the faculty member may decide that 2 tests and a project are not necessary for that objective and one test and a project would sufficiently assess that objective. Conversely, he/she may decide that for the attitude objective there needs to be more than just the student's on-going self-assessment.

## **Step 2: Analyzing formative data**

After every lecture you're now getting 20-30 muddy point cards. How can you codify this information to help improve student learning? There are many ways to use this data that may be useful to you and your students:

- Start a database of common “unclear concepts”
- keep count of the number of cards from each class to measure student comprehension of topics by lecture
- group cards by facts/principles/skills/concepts to help you decide where you need to focus
- Generate a list of “why” questions for yourself. “Why did most students not understand this idea?” or “Why is there such a range of understanding in the class on topic x?”

## **Step 3: Feeding Back Data**

Now that you have this information, what can you do with it? The data from each set of cards should be immediately “fed back” to students. This can be done in a number of ways: additional lecturing on the unclear topic, reference to pertinent articles, additional sources for clearer information, brief “lecture” information in the form of a class memo.

Whatever class assessment activities you choose can be analyzed and used immediately to improve learning in “real time”.

BUT there are many other “customers” for formative data other than students. Below is a list of constituents who would benefit from the results of your formative data.

## DATA CUSTOMERS

College Dean

Department Curriculum Committee

Department head

Advisors

Teachers of follow-up courses

Teachers of earlier courses

**Step 4:** What form should your feedback to “customers” take?

A simple, quick and easy method to feed back data is the **COURSE MEMO:**

### Course Memo

**Name:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**Course:** \_\_\_\_\_ **# students:** \_\_\_\_\_

- Please attach to this memo a copy of your course learning objectives and measurable outcomes. Please answer the following questions by annotating the sheet in red. Reflecting on your course objectives...would you change them? Add to them? Subtract some? Refocus some?
- Were your learning objectives met? Please comment and support your comments with assessment data where possible.
- Based on your reflection on the semester and your assessment data, what teaching methods worked particularly well this semester? What modifications will you make next time you teach the course?

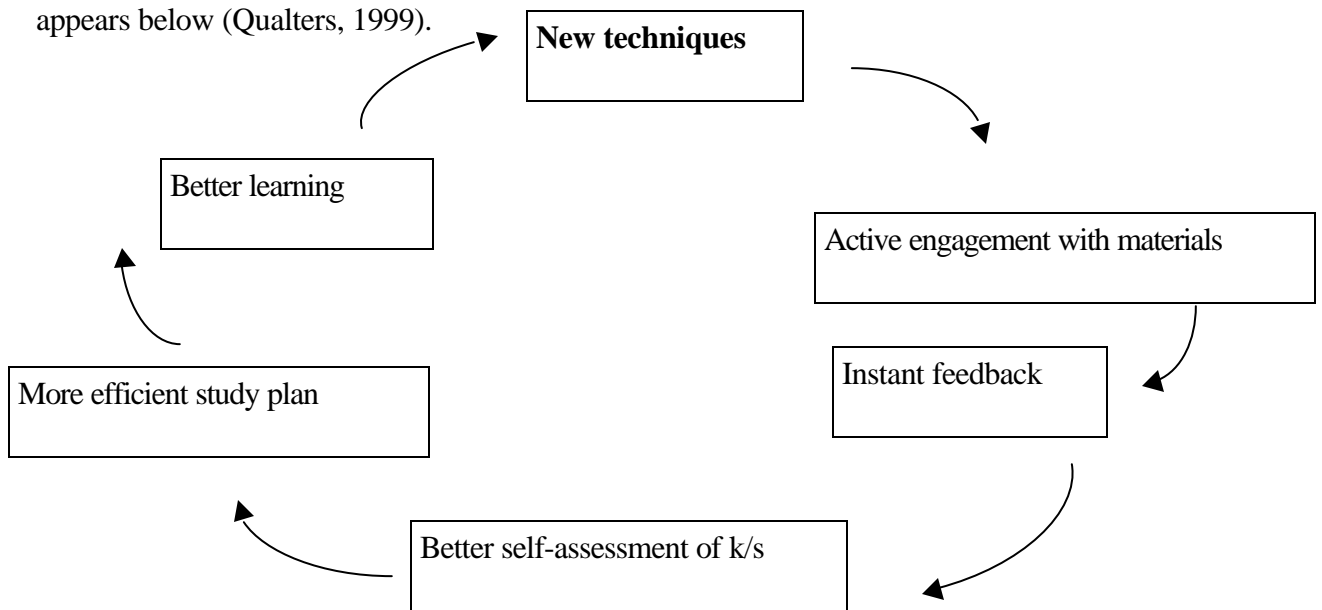
- Is there anyone else who would benefit from knowing the results in your class? Curriculum committees, other course instructors etc?
- Additional Comments (use additional sheets if necessary)

This simple form can be filled out and distributed to all identified interested parties or it can be modified to meet the needs of a particular customer. A sample memo is in the appendix and as always, colleagues are available to help you in the process.

### ***Conclusion***

Using classroom assessment will provide benefits to both students and faculty. Having an on-going emerging picture of how students learn and what they are learning will provide valuable information to inform curriculum decisions. Analysis of student data has shown that while students may be hesitant to try something new, they readily admit that the value of assessment comes from their ability to use the data to become more efficient students. Students who have experienced classroom assessment appears below (Qualters, 1999).

have defined a cycle that



If you have questions or would like to discuss classroom assessment further, please refer contact the Center for Effective University Teaching at ext.8583.