Assessment Primer

From the Field-Tested Learning Assessment Guide, Available at http://www.flaguide.org

Why do Assessment?

Are you asking too little of your class?

Are your students approaching your course as hurdlers, barely clearing required levels of performance? Or are they approaching your course like high jumpers, pushing themselves under your guidance to increasingly more challenging heights? If your students aren't high jumpers, maybe it's because you aren't asking them to high jump. By using appropriate assessment techniques, you can encourage your students to raise the height of the bar.

There is considerable evidence showing that **assessment drives student learning**. More than anything else, our assessment tools tell students what we consider to be important. They will learn what we guide them to learn through our assessments.

Traditional testing methods have been limited measures of student learning, and equally importantly, of limited value for guiding student learning. These methods are often inconsistent with the increasing emphasis being placed on the ability of students to think analytically, to understand and communicate at both detailed and "big picture" levels, and to acquire life-long skills that permit continuous adaptation to workplaces that are in constant flux. Moreover, because assessment is in many respects the glue that links the components of a course - its content, instructional methods, and skills development - changes in the structure of a course require coordinated changes in assessment.

This Primer is designed to welcome you to the world of classroom assessment. The College Level One (CL-1) Team assumes you are here because you are interested in better ways to assess student learning in your class and in helping your students become more reflective and effective learners.

One goal of this website is to provide resources that enable you to begin this journey to more effective assessment of student learning. The first step is to articulate your course goals. Once you have identified your course goals, this website presents Classroom Assessment Techniques or CATs that are aligned with them. The CATs are a rich, eye-opening source of ideas and associated tools that have been extensively field-tested by your colleagues across the spectrum of SMET disciplines and post-secondary institutions. We encourage you to explore the CATs to see how you can work with your class to assess their understanding, skills, and attitudes through concept maps, conceptests, Fermi tests, interviews, portfolios, and other related techniques and tools. If you are not familiar with these forms of assessment, we are confident that you will discover, as we have, that they provide paths to a broader and deeper understanding of student learning for both you and your students.

We close by noting that assessment is undergoing exciting changes in college SMET courses. The overarching intent of this website is to capture the vitality of assessment. The CL-1 Team views assessment as a moving target and this website as a living product, providing both a mechanism for rapid dissemination of assessment-related developments and a forum for their discussion. In this spirit, the CL-1 Team invites you to join the growing number of college SMET instructors who are identifying and developing new tools that can be used to assess student learning and to share your ideas and experiences with us. We welcome your feedback and encourage you to contact us.

An Introduction to Assessment - the Basics

What is assessment?

Why do it?

Why do it in a particular way?

This document addresses these important questions and provides an introduction to the basic concepts and terminology surrounding assessment. The discussion builds toward a generalized model for course development. Central to this discussion is the following key precept: **Assessment drives student learning**.

What Is Assessment?

Assessment is more than grades

To many, the word "assessment" simply means the process by which we assign students grades. Assessment is much more than this, however. Assessment is a mechanism for providing instructors with data for improving their teaching methods and for guiding and motivating students to be actively involved in their own learning. As such, assessment provides important feedback to both instructors and students.

Assessment is Feedback for Both Instructors and Students

Assessment gives us essential information about what our students are learning and about the extent to which we are meeting our teaching goals. But the true power of assessment comes in also using it to give feedback *to our students*. Improving the quality of learning in our courses involves not just determining to what extent students have mastered course content *at the end of the course*; improving the quality of learning also involves determining to what extent students are mastering content *throughout the course*.

Thus, in addition to providing us with valuable information about our students' learning, assessment should assist our students in diagnosing *their own* learning. That is, assessment should help students "become more effective, self-assessing, self-directed learners."[1] Various

classroom assessment techniques (CATs) have been developed with this in mind. The CATs provided in the FLAG site have been field-tested and shown to be effective at both measuring student mastery of content and at providing students with the feedback they need to become active participants in the learning process. Indeed, such feedback can positively influence what our students learn because assessment drives student learning.

Assessment Drives Student Learning

The types of assessment usually performed in first-year science, math, engineering, and technology (SMET) courses--giving students tests--merely inform students about their grade, or ranking, *after* they have received instruction. In addition, these common testing techniques--which typically test for fact-based knowledge and algorithmic problem solving--tell our students that this is the type of knowledge we think is most important. That is, we appear to value the understanding of concepts at a relatively low level.

Given that this is the type of assessment our students most frequently encounter, and that it will eventually lead to their final course grades, students learn to study the content in our courses in an expeditious way that allows them to succeed in passing many first-year SMET courses without necessarily developing deep understanding of concepts. *It is our assessment that drives students learning*.

In fact, assessment drives student learning whether we want it to or not. The consequences of relying upon our "tried and true" assessment methods are profound; these assessment methods may actively promote superficial learning. If we wish to actively steer what our students learn, and how well they learn it, we must (1) actually decide what we want our students to take away from the course, and (2) choose our classroom assessment techniques appropriately (Anderson & Sosniak, 1994; National Research Council, 1996; Tobias & Raphael, 1997; Wiggins, 1998). The importance of setting course goals--articulating them and writing them down--cannot be overstated. Evaluating the extent to which we have attained our stated course goals is the primary motivation for why we "do assessment". Furthermore, ensuring that our assessment techniques can measure our stated goals is the reason for why we "do assessment in a particular way".

Why do assessment?

To evaluate attainment of course goals

For every course we teach, we make decisions about what we want our students to know and be able to do by the end of the semester. Though we might not always formalize these goals by writing them down, we still make decisions about the curriculum, the instructional methods, and the assessment techniques we will employ. In terms of curriculum, we decide which topics to cover, and how they connect with previous and forthcoming topics. We also decide which instructional methods we will use to deliver the curriculum, be they lectures, group activities, readings, homework assignments, etc. Similarly, we decide what assessment techniques we will use (e.g., multiple-choice tests). Thus, the decisions we make reflect our goals for the course whether we state them or not. It is important, therefore, to formalize course goals while the

course is still in its planning stage. The FLAG site includes a section on Aligning Goals CATs to assist with identifying course goals.

Formalizing our goals is only the first step, however. We must also measure the extent to which we are attaining these goals. This is why we do assessment. Logically, we must choose classroom assessment techniques that are appropriately suited to measuring our particular goals. That is, we must align our assessment techniques with our stated goals.

Why do assessment in a particular way?

To align assessment with stated goals
The most commonly employed CAT in first-year SMET courses is the multiple-choice test. Such tests are usually most effective at measuring fact-based knowledge and ability to perform algorithmic problem-solving. If our stated goals are that students be able to recite facts and to solve simple algorithmic problems, then in fact the chosen assessment technique is well aligned with the stated goals. However, if our goals include different student outcomes than these (e.g., an understanding of the scientific "process", a lifelong interest in the subject, the ability to critically analyze science in popular media, etc.), then this assessment technique will not provide useful feedback about attainment of these goals.

Furthermore, misaligned assessment techniques convey to our students the wrong message about what we want them to take from the course. As suggested previously, our choice of assessment technique drives student learning.[2]

These are the basics of assessment--the fundamental principles behind why we do it and why we do it in a particular way. At this point, if you are ready to stop reading about assessment and are ready to start implementing some of what you've just learned, the FLAG site provides a facility for formalizing course goals and a suite of field-tested classroom assessment techniques that are well suited for a variety of course goals.

But you may also wish to go beyond the basics of assessment. Concerns about assessment are not the only ones faced in the development and refinement of SMET courses; decisions about curriculum and instructional methods are equally important, and assessment plays a vital role in guiding these decisions. A more in-depth discussion of how curriculum, instructional methods, and assessment fit together is provided in "Assessment Within the Broader Context of Course Development," where we describe a generalized model for course development that builds upon the precepts that *assessment drives student learning* and that *assessment provides feedback for both instructors and students*. You will then find the FLAG site's facility for formalizing course goals and its suite of field-tested classroom assessment techniques to be of even greater value.

Assessment within the Broader Context of Course Development: A More In-Depth Look at Assessment - The Holistic View

Assessment Drives Course Development

Assessment plays a dual role: It *drives student learning* and it *provides important feedback for both students and instructors*. In An Introduction to Assessment: The Basics, we focused primarily on the former of these two roles. Students want to "do well" (receive high grades) in their courses, and they use our assessment techniques as the means for determining what it is we expect them to learn and for diagnosing how well they are learning it. Students will adapt their mastery of course content to what our assessment techniques require of them. Thus, if we want students to achieve our course goals, we must choose appropriate assessment techniques that guide our students to those goals.

In this document, we build upon the *feedback* role of assessment. In particular, we discuss the feedback that assessment provides the instructor, and the ways in which *assessment drives course development*. We want our students to "do well" (attain our course goals), and we use our assessment techniques as the means for diagnosing how well our students are doing. We can modify our curriculum and instructional methods based on what our assessment techniques tell us about what students are learning compared to what we want them to learn. We must, therefore, choose assessment techniques that will give us *useful feedback* for refining our curriculum and our instructional methods so that we achieve our course goals.

What follows is a generalized model for course development, within which assessment plays a critical role. Not surprisingly, this course development model centers on course goals. As we will see, our goals determine the curriculum, instruction, and assessments that are best suited for the course, and we will see that assessment serves as the "feedback loop" wherein we evaluate the extent to which our curriculum and instruction choices are leading to the attainment of course goals so that we may then modify the curriculum and instructional methods based on this evaluation.

A Generalized Model for Course Development

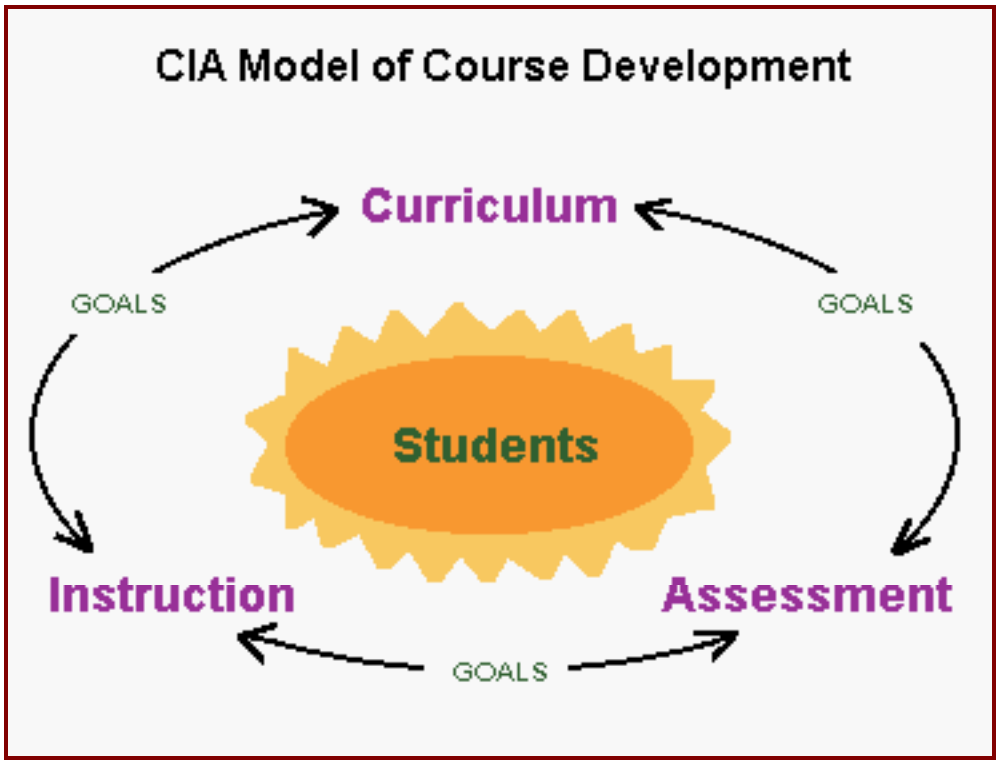

Figure 1

Curriculum, Instruction, and Assessment

The three primary components of any course are the curriculum (the "content"), the instructional methods used to deliver the curriculum, and the assessment techniques with which our success in attaining course goals is evaluated. These three components (curriculum, instruction, assessment-CIA) are inextricably linked, and are bound together by the goals we set for the course. The CIA model presented here requires that goals be formalized at the outset, which is to say that goals be clearly articulated. Ultimately, it is our course goals that set the standard against which the success of the course development effort must be measured. In this context, the role of assessment is to measure the efficacy of our curriculum and of our instructional methods *with respect to* stated course goals. This is how curriculum, instruction, and assessment are linked in the CIA model.

While formalizing goals is the most important part of course development, it is only the first step. The path through the course development process can be envisioned as a "road map", with goals at the beginning, pointing the way, to assessment at the end, telling us if we have reached our destination or if we need to retrace our steps. This course development "road map" (Figure 1) provides a detailed set of directions, with specific actions to be taken at several signposts along the way. Starting from formalizing course goals, the "directions" are as follows:

- *translate* goals into Measurable Student Outcomes
- *determine* Levels of Expertise required to achieve outcomes
- *select* both Curriculum and Classroom Assessment Techniques
- *choose and implement* Instructional Methods

- *conduct* Assessment and *evaluate*--were Measurable Student Outcomes realized?

Let's consider these steps in turn.

Translating Course Goals Into Measurable Student Outcomes
Assessment can measure the extent to which course goals have been achieved, but only if those goals are measurable. For the most part, however, course goals are too broad or too abstract to measure directly. This is one of the first difficulties often encountered in the course development process. For example, one course goal in an introductory astronomy course might be that "students understand the seasons." But how does one measure "understand"? This goal can be made more measurable by identifying specific outcomes one would expect from a student who "understands" the seasons. For example: The student can "define seasons" and can "distinguish the importance of different factors such as tilt and distance."

Thus, once goals have been formalized, the next step in course development is to translate the often abstract language of course goals into a set of concrete *measurable student outcomes*. Measurable student outcomes are specific, demonstrable characteristics--knowledge, skills, values, attitudes, interests--that will allow us to evaluate the extent to which course goals have been met. For each course goal, identify the principal outcomes one would expect from a student who has achieved that goal, keeping in mind that our ability to measure the achievement of course goals will be determined entirely on the basis of these measurable student outcomes. Of course, knowing what kinds of outcomes are actually measurable requires knowledge of the kinds of assessment techniques that are available, and what each technique can and cannot measure. Don't worry: we'll discuss different assessment techniques later, and the section on Classroom Assessment Techniques presents a variety of these assessment methods and how they connect with different measurable student outcomes. Figure 2 gives an example of translating a specific course goal (in the context of dental health) into measurable student outcomes.

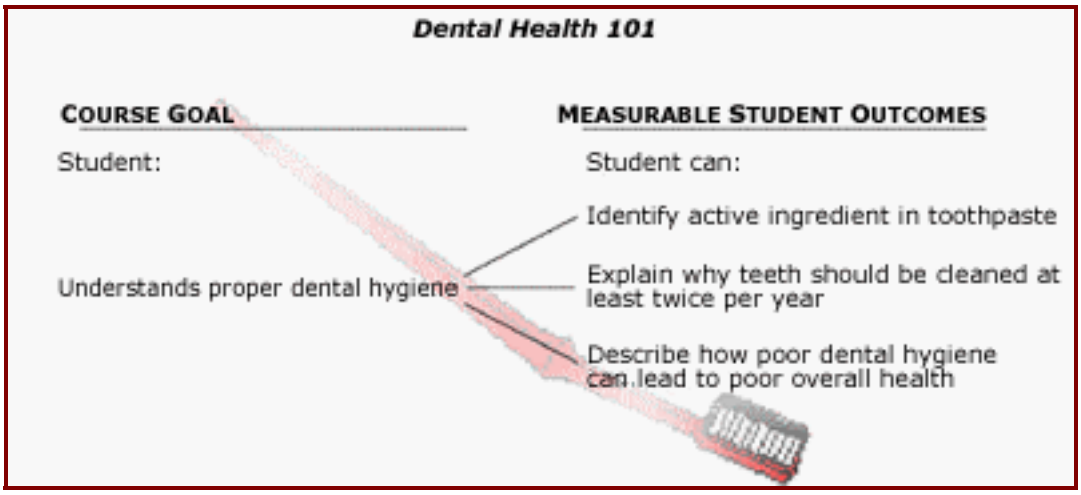

Figure 2 - An example of translating a course goal into measurable student outcomes.

Determining Levels of Expertise Required to Achieve Measurable Student Outcomes
Having translated course goals into measurable student outcomes, we are one step closer to selecting the curriculum, instructional methods, and assessment techniques that will constitute

the course. In order to select the CIA that are best suited for the course goals we have identified, it is necessary to determine the levels of expertise that are required for achieving the measurable student outcomes that go with each course goal. The levels of expertise that we assign to measurable student outcomes are important because they are the factors that most directly determine the appropriate choices of CIA for the course.

What do we mean by "levels of expertise"? The various student outcomes that we assign to each course goal require different levels of mastery of course content. Some student outcomes require no more than students simply knowing the correct answer. However, many student outcomes require more sophisticated levels of understanding--or levels of expertise. Consider again the dental hygiene example above (Figure 2): The measurable student outcome of "knows the active ingredient in toothpaste" requires only that students memorize the correct answer (fluoride), while the outcome of "can describe how poor dental hygiene can lead to poor overall health" requires a much more sophisticated level of understanding, involving synthesis of multiple facts and concepts. Again, *measurable student outcomes vary in the levels of expertise required to achieve them*. Accordingly, the criteria by which we measure student success in achieving desired measurable student outcomes--our classroom assessment techniques--should be capable of assessing a variety of levels of expertise. In general, this means using a variety of classroom assessment techniques. Let's consider how to go about determining levels of expertise for our measurable student outcomes.

Bloom's Taxonomy of Educational Objectives

One of the most widely used ways of organizing levels of expertise is according to Bloom's Taxonomy of Educational Objectives.[3] Bloom's Taxonomy (Tables 1-3) uses a multi-tiered scale to express the level of expertise required to achieve each measurable student outcome. Organizing measurable student outcomes in this way will allow us to select appropriate classroom assessment techniques for the course.

There are three taxonomies. Which of the three to use for a given measurable student outcome depends upon the original goal to which the measurable student outcome is connected. There are *knowledge-based* goals, *skills-based* goals, and *affective* goals (affective: values, attitudes, and interests); accordingly, there is a taxonomy for each. Within each taxonomy, levels of expertise are listed in order of increasing complexity. Measurable student outcomes that require the higher levels of expertise will require more sophisticated classroom assessment techniques.

The course goal in Figure 2--"student understands proper dental hygiene"--is an example of a *knowledge-based* goal. It is *knowledge-based* because it requires that the student learn certain facts and concepts. An example of a *skills-based* goal for this course might be "student flosses teeth properly." This is a *skills-based* goal because it requires that the student learn *how to do* something. Finally, an *affective* goal for this course might be "student cares about proper oral hygiene." This is an *affective* goal because it requires that the student's values, attitudes, or interests be affected by the course.

Table 1: Bloom's Taxonomy of Educational Objectives for *Knowledge-Based Goals*

Level of Expertise	Description of Level	Example of Measurable Student Outcome
1. Knowledge	Recall, or recognition of terms, ideas, procedure, theories, etc.	When is the first day of Spring?
2. Comprehension	Translate, interpret, extrapolate, but not see full implications or transfer to other situations, closer to literal translation.	What does the summer solstice represent?
3. Application	Apply abstractions, general principles, or methods to specific concrete situations.	What would Earth's seasons be like if its orbit was perfectly circular?
4. Analysis	Separation of a complex idea into its constituent parts and an understanding of organization and relationship between the parts. Includes realizing the distinction between hypothesis and fact as well as between relevant and extraneous variables.	Why are seasons reversed in the southern hemisphere?
5. Synthesis	Creative, mental construction of ideas and concepts from multiple sources to form complex ideas into a new, integrated, and meaningful pattern subject to given constraints.	If the longest day of the year is in June, why is the northern hemisphere hottest in August?
6. Evaluation	To make a judgment of ideas or methods using external evidence or self-selected criteria substantiated by observations or informed rationalizations.	What would be the important variables for predicting seasons on a newly discovered planet?

Table 2: Bloom's Taxonomy of Educational Objectives for *Skills-Based Goals*

Level of Expertise	Description of Level	Example of Measurable Student Outcome
Perception	Uses sensory cues to guide actions	Some of the colored samples you see will need dilution before you take their spectra. Using only observation, how will you decide which solutions might need to be diluted?
Set	Demonstrates a readiness to take action to perform the task or objective	Describe how you would go about taking the absorbance spectra of a sample of

		pigments?
Guided Response	Knows steps required to complete the task or objective	Determine the density of a group of sample metals with regular and irregular shapes.
Mechanism	Performs task or objective in a somewhat confident, proficient, and habitual manner	Using the procedure described below, determine the quantity of copper in your unknown ore. Report its mean value and standard deviation.
Complex Overt Response	Performs task or objective in a confident, proficient, and habitual manner	Use titration to determine the K_a for an unknown weak acid.
Adaptation	Performs task or objective as above, but can also modify actions to account for new or problematic situations	You are performing titrations on a series of unknown acids and find a variety of problems with the resulting curves, e.g., only 3.0 ml of base is required for one acid while 75.0 ml is required in another. What can you do to get valid data for all the unknown acids?
Organization	Creates new tasks or objectives incorporating learned ones	Recall your plating and etching experiences with an aluminum substrate. Choose a different metal substrate and design a process to plate, mask, and etch so that a pattern of 4 different metals is created.

Table 3: Bloom's Taxonomy of Educational Objectives for *Affective Goals*

Level of Expertise	Description of Level	Example of Measurable Student Outcome
Receiving	Demonstrates a willingness to participate in the activity	When I'm in class I am attentive to the instructor, take notes, etc. I do not read the newspaper instead.
Responding	Shows interest in the objects, phenomena, or activity by seeking it out or pursuing it for pleasure	I complete my homework and participate in class discussions.
Valuing	Internalizes an appreciation for	I seek out information in

	(values) the objectives, phenomena, or activity	popular media related to my class.
Organization	Begins to compare different values, and resolves conflicts between them to form an internally consistent system of values	Some of the ideas I've learned in my class differ from my previous beliefs. How do I resolve this?
Characterization by a Value or Value Complex	Adopts a long-term value system that is "pervasive, consistent, and predictable"	I've decided to take my family on a vacation to visit some of the places I learned about in my class.

To determine the level of expertise required for each measurable student outcome, first decide which of these three broad categories (knowledge-based, skills-based, affective) the corresponding course goal belongs to. Then, using the appropriate Bloom's Taxonomy, look over the descriptions of the various levels of expertise. Determine which description most closely matches that measurable student outcome. As can be seen from the examples given in the three Tables, there are different ways of representing measurable student outcomes, e.g., as statements about students (Figure 2), as questions to be asked of students (Tables 1 and 2), or as statements from the student's perspective (Table 3). You may find additional ways of representing measurable student outcomes; those listed in Figure 2 and in Tables 1-3 are just examples.

Bloom's Taxonomy is a convenient way to describe the degree to which we want our students to understand and use concepts, to demonstrate particular skills, and to have their values, attitudes, and interests affected. It is critical that we determine the levels of student expertise that we are expecting our students to achieve because this will determine which classroom assessment techniques are most appropriate for the course. Though the most common form of classroom assessment used in introductory college courses--multiple choice tests--might be quite adequate for assessing knowledge and comprehension (levels 1 and 2, Table 1), this type of assessment often falls short when we want to assess our students knowledge at the higher levels of synthesis and evaluation (levels 5 and 6).[4]

Multiple-choice tests also rarely provide information about achievement of skills-based goals. Similarly, traditional course evaluations, a technique commonly used for affective assessment, do not generally provide useful information about changes in student values, attitudes, and interests.

Thus, commonly used assessment techniques, while perhaps providing a means for assigning grades, often do not provide us (nor our students) with useful feedback for determining whether students are attaining our course goals. Usually, this is due to a combination of not having formalized goals to begin with, not having translated those goals into outcomes that are measurable, and not using assessment techniques capable of measuring expected student outcomes given the levels of expertise required to achieve them. Using the CIA model of course

development, we can ensure that our curriculum, instructional methods, *and* classroom assessment techniques are properly aligned with course goals.

Note that Bloom's Taxonomy need not be applied exclusively after course goals have been defined. Indeed, Bloom's Taxonomy and the words associated with its different categories can help in the goals-defining process itself. Thus, Bloom's Taxonomy can be used in an iterative fashion to first state and then refine course goals. Bloom's Taxonomy can finally be used to identify which classroom assessment techniques are most appropriate for measuring these goals.

Selecting Course Curriculum (Content) and Classroom Assessment Techniques
We are now at the point in the course development "road map" where concrete decisions must be made about what will be included in the course curriculum. As the instructor of the course, choices about course content are entirely yours to make based upon what you want your students to take from the course. It would be beyond the scope of this document to attempt to discuss specific choices about curriculum in detail. We do comment, however, that here again goals are paramount. If you are working from an existing syllabus (either your own or someone else's), take this opportunity to critically re-examine each component of the curriculum *with respect to* your course goals. Are there topics in the syllabus that are not related to one or more course goals? Don't include content merely because "it's always been done that way" or because "it's important". If a topic is important, it will be reflected in your goals. If an "important" topic is not reflected in your course goals, you may wish to re-visit the goals themselves. In any case, each and every aspect of the curriculum should connect clearly to course goals.

This is also the point in the course development "road map" where specific classroom assessment techniques (CATs) must be selected based upon measurable student outcomes and their associated levels of expertise. The FLAG site was designed primarily to help you through this step in the course development process. Provided for your use are a variety of CATs that have been tested in the field and which are authored by national experts in the use of that particular technique. To be sure, the CATs provided in the FLAG site are but a subset of innovative CATs available from a variety of resources. The CATs provided in the FLAG site should give you a good start.

The CATs selected in this step will provide the feedback you need to evaluate the extent to which yours course goals have been achieved. Thus, it is imperative that the CATs you select be properly matched with your measurable student outcomes. The FLAG site provides a facility for helping you do this.

Choosing and Implementing Instructional Methods
With your course goals formalized, having translated those goals into measurable student outcomes and assigning to each appropriate levels of expertise, and having selected the course curriculum and CATs, we are finally in a position to actually teach. That is, we are at the point in the course development "road map" where we choose and implement the instructional methods that will best guide our students to attainment of our course goals.

As with choosing curriculum and assessment, the choice of instructional methods must be guided by our course goals and, perhaps even more so, by the levels of expertise associated with

measurable student outcomes. For example, suppose that two of the course goals in an introductory engineering course are that (1) students learn how to "design simple machines that satisfy realistic constraints" and (2) that students "can work effectively as part of a design team". A common measurable student outcome for these goals might be that "students, working in a team, can design a device, using simple raw materials, that protects an egg when dropped from a height of two stories". This measurable student outcome is at the "Organization" level of expertise (Bloom's Taxonomy of Educational Objectives for Skills-Based Goals; Table 2) because it requires students to "create new tasks or objectives incorporating learned ones". Traditional lecturing alone would not be a sufficient instructional method in this case. Instead, an instructional method that emulates teamwork and that promotes creative thought would be more appropriate. That is, a more collaborative instructional method is called for.

A variety of instructional methods have been developed for guiding students to the different levels of expertise represented by the goals of our course. One commonly used instructional method--collaborative learning--is described in detail in the College Level One's Collaborative Learning website (http://www.wcer.wisc.edu/nise/cl1/cl). In fact, you will find that collaborative learning instructional methods are appropriate and useful for a wide variety of goals, outcomes, and levels of expertise.

Conducting Assessment and Evaluating Attainment of Goals: Closing the Feedback Loop
It is in this final step of the course development process that we harness the power of the data provided by the CATs used during the implementation of the course. Some of this assessment data may be used for assigning grades to our students. Ultimately, however, the real value of this assessment data comes when we use it for improving the course. That is, our assessment data provide us with critical feedback for evaluating what we've done: What works and what doesn't? Depending upon the CATs we have chosen, this feedback may be used either at the end of the course (to summarize the efficacy of our course development efforts) or along the way (to inform our course development efforts in progress). When assessment data is used to evaluate the course in summary fashion at the end, it is called *summative*. When assessment data is used to modify the course *while it is in progress*, it is called *formative*. Either way, the point of assessment is to give us the information we need for evaluating achievement of our course goals.

How, specifically, do we perform this evaluation? By what criteria do we know if we have achieved our goals? Our measurable student outcomes are the key: If these outcomes are realized, we will know that we have attained our course goals. Look at the assessment data. Did your students achieve the hoped-for outcomes, and at the desired levels of expertise? Using the engineering example from above, perhaps the egg survived but only because one student in the team did all of the work, i.e., the outcome related to teamwork was not realized. How might you modify the course to better foster effective teamwork? Perhaps students needed more guidance on how to work collaboratively; consider how the curriculum and/or instructional methods might be changed to accomplish this. Or perhaps it is the teamwork goal itself that needs refining. It is this important, evaluative step that allows you to determine the extent to which you are reaching your course goals and to decide if there are changes you would like to make.

We close this section by noting that the terms *assessment* and *evaluation* are often incorrectly used interchangeably. Assessment is the collecting of data to inform both the instructor and the

student as to how the course is progressing (formative) or how it has ended (summative). Assessment involves gathering data via one or more classroom assessment techniques. Evaluation is what we do with these data once we have them. Once we have acquired the assessment data, it is up to us to judge the efficacy of our instructional methods, the content of our course, and the achievement of our course goals.

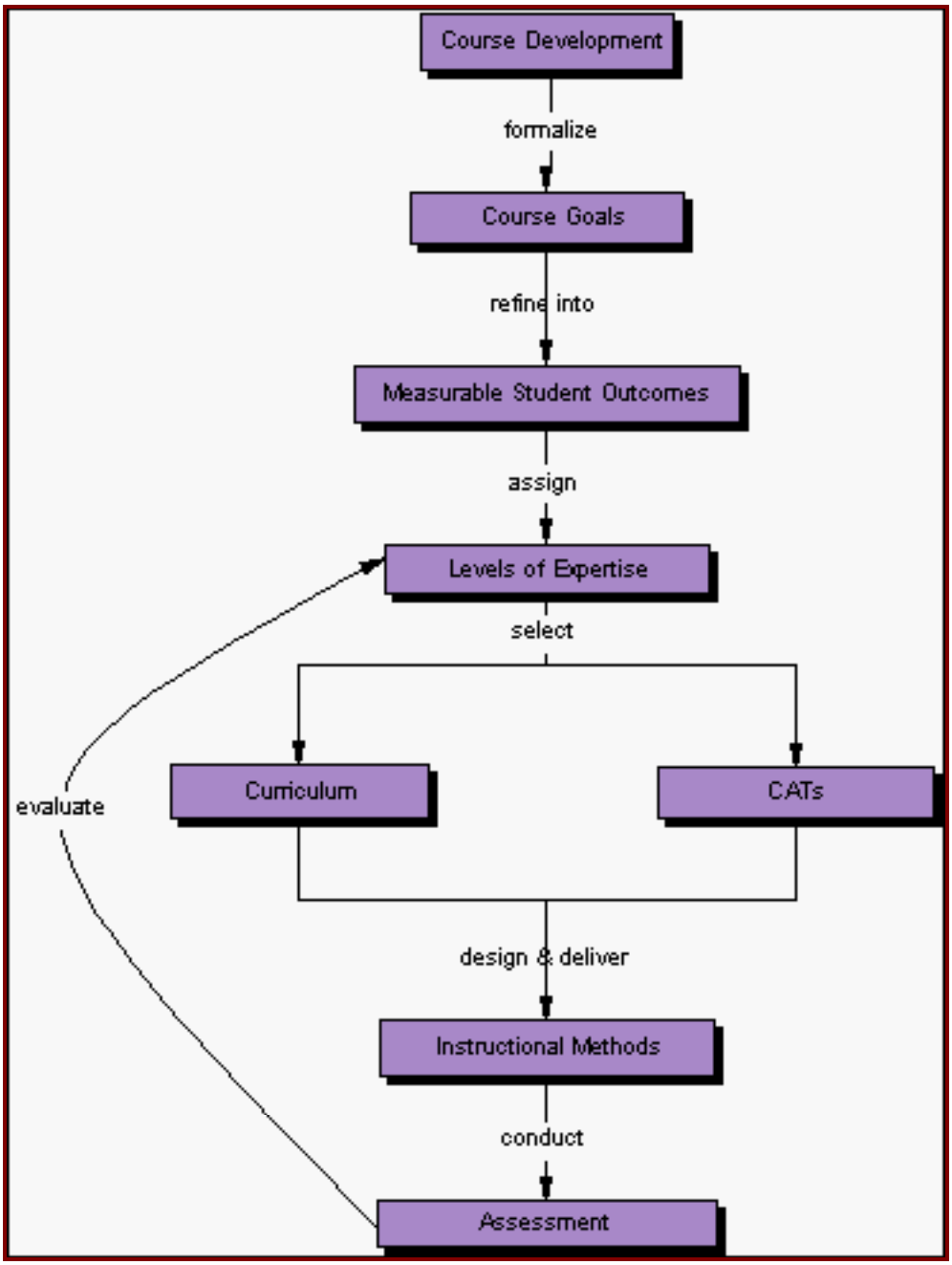

Figure 3 - Road Map of Course Development.

Summary

Assessment Is Feedback for both Students and Instructors

The perspective that has been advocated here is that we can use carefully constructed classroom assessment techniques as a means of determining whether or not we are meeting our stated course goals, not just for assigning our students grades. For us, classroom assessment can help us answer the following questions:

- To what extent are my students achieving the stated course goals?
- How should I allocate class time for the current topic?
- Can I introduce this topic in a more effective way?
- What parts of this course are my students finding most valuable?
- How will I change this course the next time I teach it?
- Which grades do I assign my students?

For our students, classroom assessment answers a different set of questions:

- Do I know what my instructor thinks is most important?
- Am I mastering the course content?
- How can I improve the way I study in this course?
- What grade am I earning in this course?

Answering these questions and others can inform and improve the quality of student learning in our classes.

A Charge to Change

We can not emphasize enough how important it is to actually write down your course goals and share them with your students. Our goals are what bind the course together (Figure 3). Our choices of curriculum, instruction, and assessment are all guided by--and held together by--our goals. Once your course goals are set, questions about instruction, assessment, and grading will be much more focused. This is a small step beyond the assessment strategies that most faculty are already doing; yet with a small investment in planning, the data acquired can provide valuable feedback for improving the quality of student learning. And ultimately, our students are what course development is all about.

Resources

- Aligning Goals to CATs
- Classroom Assessment Techniques (CATs)

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Footnotes

1. Angelo & Cross, 1993, p. 4

2. Anderson & Sosniak, 1994; National Research Council, 1996; Tobias & Raphael, 1997; Wiggins, 1998

3. Bloom et al., 1994; Gronlund, 1991; Krathwohl et al., 1956

4. Bloom et al., 1994; Tobias & Raphael, 1997