Assessing Student Learning

Victor Valley College
Contents

Introduction ................................................................. 3

Chapter 1 Writing Student Learning Outcomes ......................... 7

Chapter 2 Program Assessment and Student Learning Outcomes .......... 23

Chapter 3 Assessment Tools and Data ................................ 35

Chapter 4 Why Assessment; History, Background and Definitions ......... 58

Chapter 5 What is Program Assessment? ................................ 73

Chapter 6 Defining Goals and Objectives ............................. 77

Appendix 6A Worksheet .................................................. 84

Chapter 7 Designing the Assessment Program .......................... 85

Appendix 7A Worksheet .................................................. 91
Introduction

The purpose of this manual is to make developing SLOs possible and practical in any course or program. Good assessment requires faculty with expertise and resources to measure and report learning in a variety of courses, under diverse conditions, about students with varied abilities and levels of academic engagement.

Higher education faculty members are hired for their discipline expertise. Training in pedagogy and assessment often occurs on the run. Many of us emulate the most effective faculty from our own college experience. But assessing student learning is not new to faculty; we do this every semester as we evaluate student work. However, meeting the assessment expectations delineated in the new accreditation standards requires conventions beyond typical grading. The good news is that assessment practices can make student evaluation more meaningful, benefit your teaching, and improve student learning.

Faculty must be both discipline experts and skilled assessment practitioners. Throughout this manual, assessment practices will be modeled in the same way that you might use them in your classroom. American Association for Higher Education

Principles of Good Practice for Assessing Student Learning

- The assessment of student learning begins with educational values.
- Assessment is most effective when it reflects an understanding of learning as multidimensional, integrated, and revealed in performance over time.
- Assessment works best when the programs it seeks to improve have clear, explicitly stated purposes.
- Assessment requires attention to outcomes but also and equally to the experiences that lead to those outcomes.
- Assessment works best when it is ongoing, not episodic.
- Assessment fosters wider improvement when representatives from across the educational community are involved.
- Assessment makes a difference when it begins with issues of use and illuminates questions that people really care about.
- Assessment is most likely to lead to improvement when it is part of a larger set of conditions that promote change.
- Through assessment, educators meet responsibilities to students and to the public.
“We want students to be effective communicators, to be discriminating critical thinkers, to have content knowledge, to be life-long learners, to have aesthetic appreciation, and so on. The problem with goals is that they are basically invisible. How can one tell if students possess these attributes? Faculty members often say, “I can tell that my students are learning because I can see it in their eyes.” This is nonsense, of course, because the clairvoyance claimed by the faculty members is neither reproducible nor transferable to anyone else. Hence, we need to do assessment in order to figure out how effective our curriculum is at producing the desired learning. But if goals are inherently invisible, how do we assess whether students have actually learned them? The key is to assess visible indicators. This means translating goals into associated, tangible learning objectives. In order to make this translation, professors need to answer this question: “What would you, a reasoned skeptic, need to witness in order to be convinced that students were on the path toward achieving the designated goal?” For example, if the goal is effective communication in a chemistry student, then the learning objective might be delivery of a speech on a technically complex topic using jargon-free speech to a lay audience. The speech would be an indicator that the student is an effective communicator and that the curriculum is effective in producing students with this attribute.”

Dr. Douglas Eder Southern Illinois University Edwardsville (SIUE)
**Assessment Tools**

This manual embeds assessment activities in an attempt to model assessment not only as a means to collect data, but also as a tool to both engage students and teach material. Some of these assessment activities involve short immediate feedback questions using a technique developed by Angelo and Cross called Classroom Assessment Techniques (CATs). However, while very valuable, assessment of student learning goes beyond the short anonymous feedback techniques used in CATs. Classroom Assessment Techniques as described by Angelo and Cross’s.

Some assessments within this manual will involve self-evaluative questionnaires to help you define your teaching practice. Most of these are quick surveys, linked to online forms, scored automatically, and often provide comparisons with people from the same and other disciplines.

When the inbuilt assessments ask you to discuss ideas or classroom practices with other faculty - please do this; dialogue is essential to the assessment process and will initiate rich professional discussions. As you talk to others keep the following things in mind:

- each course and classroom has unique factors
- disciplines have unique language and culture
- cross disciplinary conversations are invaluable
- ultimately discipline-specific conversations best define student competencies
- everyone is a learner when it comes to assessment
- as professionals we are both guided and constrained by the principles of academic freedom (see link to the right for the official AAUP academic freedom policy)
Assessment Cycle*

Develop, modify, or review curriculum, course, program, or service.

Develop or modify Student Learning Outcomes (SLOs)

Determine course or program refinements based on outcomes data.

Design & Measure Student Learning as a result of the Curriculum, Course, or Program

Collect, discuss, and analyze data.
While the Assessment cycle is continuous, as we engage in this ongoing process, we will begin with Developing Student Learning Outcomes

Chapter 1: Writing Student Learning Outcomes
Student Learning Outcomes

When planning for our courses and programs, the primary question is no longer, "What will I teach (or what content will I cover) in this class or program?". The primary question becomes "What will the students learn?"

Assessment forces us to look at what the students will be able to do at the end of the course (or program, or counseling appointment, or student government activity) that they could not do at the beginning.

There are two more important questions, "How will I know what they can do?" and "How will students know what they can do?"

The heart and core of assessment are statements that define what the students should be able to do - the student learning outcomes (SLOs).
The Language of Assessment

**Outcomes** - something that happens to an individual student as a result of attendance at a higher education institution.

**Learning** - particular levels of knowledge, skills, and abilities that a student has attained at the end of engagement in a particular set of collegiate experiences.

**Knowledge** - particular areas of disciplinary or professional content that students can recall, relate, and appropriately deploy.

**Skills** - the learned capacity to do something.

**Attitudinal outcomes** - changes in beliefs or development of certain values.

**Abilities** - the integration of knowledge, skills, and attitudes in complex ways that require multiple elements of learning.

**Competencies** - the specific level of performance that students are expected to master.

Student learning outcomes are the specific measurable goals and results that are expected subsequent to a learning experience. These outcomes may involve knowledge (cognitive), skills (behavioral), or attitudes (affective) that display evidence that learning has occurred, at a specified level of competency, as a result of a course or program. Learning outcomes are clear and assessable statements that define what a student is able to DO at the completion of a course or program.

**How do objectives and goals differ from learning outcomes?**

Student learning outcomes build upon, but are different from, course or program objectives and goals because they represent a new perspective.

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objectives represent valuable skills, tools, or content (nuts and bolts) that enable a student to engage a particular subject.</td>
<td>SLOs represent overarching products of the course.</td>
</tr>
<tr>
<td>Objectives focus on content and skills important within the classroom or program: what the staff and faculty will do. Often termed the input in the course.</td>
<td>Outcomes express higher level thinking skills that integrate the content and activities and can be observed as a behavior, skill, or discrete useable knowledge upon completing the class.</td>
</tr>
<tr>
<td>Objectives can often be numerous, specific, and detailed. Assessing and reporting on each objective for each student may be impossible.</td>
<td>An assessable outcome is an end product that can be displayed or observed and evaluated against criteria.</td>
</tr>
</tbody>
</table>

“Outcomes demonstrate an understanding and application of a subject beyond the nuts and bolts which hold it together; objectives represent the nuts and bolts.” (BC Chemistry Prof).
Goals, Objectives & Outcomes

Course Goal – the purpose of the course

- The goal of this general art course is to cultivate a sense of aesthetic significance through analysis of problems and interpretations as they apply to a variety of disciplines.
- The goal of this general education biology course is to help students acquire and retain relevant biologic knowledge/information, teach them to think/apply this knowledge, and stimulate them to continue learning in the field.
- The goal of this nutrition course is to prioritize key nutrition behaviors, identify health and nutrition needs, and integrate these behaviors into health interventions, educational training, and policy.

Course Objectives – the specific teaching objectives detailing course content and activities. (see examples for the nutrition course)

- Review nutritional recommendations and components.
- Discuss differences in nutritional requirements associated with sex, age, and activity.
- Describe causes and consequences of nutritional problems.
- Explain complications of underlying physiologic conditions (e.g. diabetes & mal-absorption).
  Identify key factors involved in correcting nutritional behaviors.
- Describe resources and strategies to treat nutritional disorders.

Course SLO – This is an outcome that describes what a student will do at the end of this nutrition course.

- A student will be able to analyze a documented nutritional problem, determine a strategy to correct the problem, and write a draft nutritional policy addressing the broader scope of the problem.
### SLO or Objective?

The statements below were written for programs and courses. Analyze the statements to determine whether they are goals, objectives, or student outcomes. Write G for goals, OB for objectives and SLO for student learning outcome in front of each statement.

<table>
<thead>
<tr>
<th>(Engineering course)</th>
<th>This course introduces senior engineering students to design of concrete components of structure and foundation and integrate them into overall design structures.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(History course)</td>
<td>The student is able to function in teams.</td>
</tr>
<tr>
<td>(Engineering course)</td>
<td>Functioning as a member of a team, the student will design and present a concrete structure which complies with engineering standards.</td>
</tr>
<tr>
<td>(Geography course)</td>
<td>This course will develop perspectives on GIS for representing data, information, knowledge – interplay among reality, database, and map display.</td>
</tr>
<tr>
<td>(Epidemiology course)</td>
<td>Define and assess an epidemic for a given population and recommend factors influencing the use of health services.</td>
</tr>
<tr>
<td>(Ecology course)</td>
<td>Critically review and synthesize the findings in scientific literature and make appropriate ecological recommendations based on current knowledge.</td>
</tr>
<tr>
<td>(Sociology course)</td>
<td>Students will understand that individuals (and their families) must be regarded uniquely as individuals with many contributing variables such as multicultural issues.</td>
</tr>
<tr>
<td>(Gen Ed. Communication course)</td>
<td>In addition to interpersonal communication, we will cover key issues in contemporary mass media, with an emphasis on the nature of media competition, entertainment and news, movies, television, newspapers and the Internet.</td>
</tr>
<tr>
<td>(Immunology course)</td>
<td>This course will provide students with a medically relevant foundation of knowledge regarding the components and basic principles of the immune system and the vocabulary and language of immunology.</td>
</tr>
<tr>
<td>(Math course)</td>
<td>Given data students will analyze information and create a graph that is correctly titled and labeled, appropriately designed, and accurately emphasizes the most important data content.</td>
</tr>
</tbody>
</table>
# SLO or Objective Answers

The statements below were written for programs and courses. Analyze the statements to determine whether they are goals, objectives, or student outcomes. Write G for goals, OB for objectives and SLO for student learning outcome.

<table>
<thead>
<tr>
<th></th>
<th>Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>G</strong></td>
<td>(Engineering course) This course introduces senior engineering students to design of concrete components of structure and foundation and integrate them into overall design structures.</td>
</tr>
<tr>
<td><strong>Obj</strong></td>
<td>(History course) The student is able to function in teams.</td>
</tr>
<tr>
<td><strong>SLO</strong></td>
<td>(Engineering course) Functioning as a member of a team, the student will design and present a concrete structure which complies with engineering standards.</td>
</tr>
<tr>
<td><strong>G</strong></td>
<td>(Geography course) This course will develop perspectives on GIS for representing data, information, knowledge – interplay among reality, database, and map display.</td>
</tr>
<tr>
<td><strong>SLO</strong></td>
<td>(Epidemiology course) Define and assess an epidemic for a given population and recommend factors influencing the use of health services.</td>
</tr>
<tr>
<td><strong>SLO</strong></td>
<td>(Ecology course) Critically review and synthesize the findings in scientific literature and make appropriate ecological recommendations based on current knowledge.</td>
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<td><strong>Obj</strong></td>
<td>(Sociology course) Students will understand that individuals (and their families) must be regarded uniquely as individuals with many contributing variables such as multicultural issues.</td>
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<td><strong>G</strong></td>
<td>(Immunology course) This course will provide students with a medically relevant foundation of knowledge regarding the components and basic principles of the immune system and the vocabulary and language of immunology.</td>
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<tr>
<td><strong>SLO</strong></td>
<td>(Math course) Given data students will analyze information and create a graph that is correctly titled and labeled, appropriately designed, and accurately emphasizes the most important data content.</td>
</tr>
</tbody>
</table>
Writing Student Learning Outcomes (SLOs)

When writing SLOs:

- **Focus on what the student can do.** Don't address what was taught or presented, but address the observable outcome you expect to see in the student.

- **Use active verbs.** Active verbs are easier to measure. For instance, if you want the students to understand how to correctly use a microscope - using the word *understand* is not measurable. Can you measure understanding? Instead try to imagine the outcome - Students will focus and display an image on the microscope. For this I can both develop criteria and measure ability.

- **Include an assessable expectation.** It helps if you have clearly defined expectations concerning the criteria related to that outcome. In the above example, some of the criteria related to using the microscope would include:
  
  - a clearly focused image
  - correct lighting adjustment of the diaphragm and condenser
  - appropriate magnification for the object
  - an evenly distributed specimen field
  - clearly located object identified by the pointer
  - a written identification

- **Share the outcomes with faculty from other disciplines and within your own discipline.** This helps focus the meaning of the statements. For instance in the above criteria the faculty may ask for clarification of "appropriate magnification."

- **Share the outcomes with your students.** Students need to clearly understand what is expected, they are unfamiliar with the discipline specific language. This helps focus the clarity of the statements.

- **Modify as you learn from experience.** Leave the word "DRAFT" at the top of your SLOs to remind yourself and communicate to others that you are actively improving them.
**Brainstorming about Courses & Programs**

Beginning is often the most difficult step. Remember that you have been doing this all along. Now is your chance to put what you know intuitively as a professional into words.

BRAINSTORM: In the boxes below briefly answer the questions about your course or program. This will help with defining the framework for linking course Student Learning Outcomes to program outcomes.

<table>
<thead>
<tr>
<th>Instructional Course &amp; Programs Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name a specific course or program</td>
</tr>
<tr>
<td>Are there any prerequisites for this course?</td>
</tr>
<tr>
<td>Does this course serve as a prerequisite for any other courses?</td>
</tr>
<tr>
<td>Course Purpose</td>
</tr>
</tbody>
</table>

- As the expert in this discipline and course, begin by thinking about the 3-5 most important things a student should leave your class being able to DO. 3-5 may not seem like enough, you may have 20-50 objectives for a course - but these represent the 3-5 things you will assess - most people would not want to assess and make public 20-50 different objectives.
- Spend 15 minutes brainstorming, write down words that express knowledge, skills, or values that integrate the most important aspects of your class.
### BRAINSTORM

In the boxes below briefly list words or descriptions of attitudes, skills, or knowledge that you would like your students to know or do as a result of this course or student services program.

<table>
<thead>
<tr>
<th>Attitudes or values developed as a result of this course</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Skills or performance ability as a result of this course</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Knowledge and concepts they will have as a result of this course</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

### Student Learning Outcomes Worksheet

Now that you have done some brainstorming, use the Worksheet on the next page and:

1) In one sentence, describe one **major** piece of knowledge, skill, ability or attitude that a student will have gained by the end of your class. Describe what students will **do**- not content, activities or hours.
2) Use action verbs.
3) Write it in language that a student will understand.
4) Make sure that the outcome is something that can be assessed or tested.
5) Hint: Sometimes it's easier to start backwards by thinking about the major assessments you use in the course. These would be the products or demonstrations of your outcomes. Make a list of your major assignments for this course. Then try to describe in one sentence what the students are being asked to demonstrate in those assignments.
6) A word of warning: Be careful when describing attitudes in a learning outcome. They are hard to assess. Ask yourself if the attitude is crucial to success in your course. If a student doesn't have a certain attitude, but possesses the knowledge and skills being taught, is that satisfactory?

- Use the checklist to compare your SLOs to some criteria.
- Compare the SLO drafts with:
  - course outlines
  - core concepts articulated by professional organizations
  - external expectations such as board requirements or standards
  - articulation and prerequisite agreements

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15
# Writing Student Learning Outcomes Worksheet

**Course Name and Number**

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 sentence that describes a <strong>major</strong> piece of knowledge, skill, ability or attitude that students can demonstrate by the end of the course</td>
<td>Major Assignment, Project or test used to demonstrate or apply outcome</td>
</tr>
</tbody>
</table>
## Checklist for Writing Student Learning Outcomes

<table>
<thead>
<tr>
<th>Checklist for Writing Student Learning Outcomes</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do the SLOs include active verbs?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do the SLOs suggest or identify an assessment?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do the SLOs address the expected level of learning for the course using Bloom’s Taxonomy as a guideline?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do the SLOs address more than one domain (cognitive, psychomotor, and affective)?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are the SLOs written as outcomes rather than as objectives?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Language indicates an important overarching concept (Big Picture) versus small lesson or chapter objectives.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Outcomes address what a student will be able to do at the completion of the course.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. SLOs address student competency rather than content coverage.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are the SLOs appropriate for the course?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Consistent with the curriculum document of record</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Represents a fundamental result of the course</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Aligns with other courses in a sequence, if applicable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Represents collegiate level work</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Will students understand the SLOs?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comments or suggestions:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As you talk to others about SLOs keep these things in mind:

- Each course and classroom has unique factors.
- Disciplines have unique language and culture.
- Cross disciplinary conversations are invaluable.
- Ultimately discipline-specific conversations best define competencies for students.
- Everyone is a learner when it comes to assessment.
- As professionals, we are guided by the principles of academic freedom.
SLOs, Bloom’s Taxonomy, Cognitive, Psychomotor, and Affective Domains

Bloom (1948) developed classifications of intellectual behavior and learning in order to identify and measure progressively sophisticated learning. College faculty are hired because of their discipline expertise and are sometimes unfamiliar with important pedagogical theories that contribute to effective learning. Bloom's taxonomy is especially important in higher education where outcomes need to address the student ability to use information, not just recall and regurgitate concepts. Lower levels of learning are easier to assess but do not adequately display what the student can DO with the knowledge. Refer to the next page for a diagram of Bloom's increasing levels of complex learning.

However, learning is not a purely cognitive function; learning occurs differently when it entails performing a skill or re-evaluating behavior. Three domains of learning are recognized:

- Cognitive domain defining knowledge classification. See the following page for a table describing increasing complexity in cognitive learning. Each level has examples of verbs that could be used in writing an SLO at this level. These verbs are not magic or mandatory, our faculty found them helpful, so we used a variety of models and created our own.
- Psychomotor domain (Gronlund, 1970; Harrow, 1972; Simpson, 1972) defining physical skills or tasks classification. Check out the psychomotor table on the following page.
- Affective domain (Krathwhol, Bloom, and Masia, 1964) defining behaviors that correspond to attitudes and values. Please refer to the affective table. Affective outcomes tend to be the hardest to articulate initially and often appear difficult to assess at first glance. However, cognitive outcomes often represent the outcomes most closely related to deeper thinking and life-long learning, as well as the outcomes we value most.

NOTE: Student learning outcomes should address relevant outcomes for each of these domains but must be appropriate to the course.

Think about possible means of assessing the outcomes. The essence of student learning outcomes lies in focusing on the results you want from your course rather than on what you will cover in the course. Ask yourself how you will know when you have accomplished those outcomes
Knowledge
The ability to recall what has been learnt

Comprehension
The ability to show a basic understanding

Application
The ability to apply learning to a new or novel task

Analysis
The ability to break up information logically

Synthesis
The ability to create something new

Evaluation
The ability to evaluate usefulness for a purpose

## Cognitive Domain

Learning Outcomes Related To Knowledge

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Comprehension</th>
<th>Application</th>
<th>Analysis</th>
<th>Synthesis</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student remembers or recognizes information or specifics as communicated with little personal assimilation.</td>
<td>Student grasps the meaning behind the information and interprets, translates, or comprehends the information.</td>
<td>Student uses information to relate and apply it to a new situation with minimal instructor input.</td>
<td>Student discriminates, organizes, and scrutinizes assumptions in an attempt to identify evidence for a conclusion.</td>
<td>Student creatively applies knowledge and analysis to integrate concepts or construct an overall theory.</td>
<td>Student judges or evaluates information based upon standards and criteria, values and opinions.</td>
</tr>
<tr>
<td>Cite</td>
<td>Convert</td>
<td>Apply</td>
<td>Analyze</td>
<td>Assemble</td>
<td>Access</td>
</tr>
<tr>
<td>Label</td>
<td>Define</td>
<td>Chart</td>
<td>Compare</td>
<td>Create</td>
<td>Appraise</td>
</tr>
<tr>
<td>List</td>
<td>Describe</td>
<td>Compute</td>
<td>Contrast</td>
<td>Construct</td>
<td>Conclude</td>
</tr>
<tr>
<td>Enumerate</td>
<td>Discuss</td>
<td>Demonstrate</td>
<td>Correlate</td>
<td>Design</td>
<td>Critique</td>
</tr>
<tr>
<td>Identify</td>
<td>Estimate</td>
<td>Determine</td>
<td>Diagram</td>
<td>Develop</td>
<td>Decide</td>
</tr>
<tr>
<td>Imitate</td>
<td>Explain</td>
<td>Dramatize</td>
<td>Dissect</td>
<td>Formulate</td>
<td>Defend</td>
</tr>
<tr>
<td>Match</td>
<td>Generalize</td>
<td>Establish</td>
<td>Differentiate</td>
<td>Generate</td>
<td>Diagnose</td>
</tr>
<tr>
<td>Name</td>
<td>Identify</td>
<td>Make</td>
<td>Distinguish</td>
<td>Hypothesize</td>
<td>Evaluate</td>
</tr>
<tr>
<td>Quote</td>
<td>Illustrate</td>
<td>Manipulate</td>
<td>Infer</td>
<td>Initiate</td>
<td>Judge</td>
</tr>
<tr>
<td>Recall</td>
<td>Locate</td>
<td>Prepare</td>
<td>Investigate</td>
<td>Invent</td>
<td>Justify</td>
</tr>
<tr>
<td>Reproduce</td>
<td>Paraphrase</td>
<td>Project</td>
<td>Limit</td>
<td>Modify</td>
<td>Rank</td>
</tr>
<tr>
<td>State</td>
<td>Restate</td>
<td>Solve</td>
<td>Outline</td>
<td>Reframe</td>
<td>Recommend</td>
</tr>
<tr>
<td>Write</td>
<td>Summarize</td>
<td>Use</td>
<td>Separate</td>
<td>Synthesize</td>
<td>Support</td>
</tr>
</tbody>
</table>

### Basic Knowledge Level
- Cite
- Label
- List
- Enumerate
- Identify
- Imitate
- Match
- Name
- Quote
- Recall
- Reproduce
- State
- Write

### More Sophisticated Knowledge Level
- Access
- Appraise
- Conclude
- Critique
- Decide
- Defend
- Diagnose
- Evaluate
- Judge
- Justify
- Rank
- Recommend
- Support

### Higher Level Thinking
- Critical Thinking
### Psychomotor Domain

#### Learning Outcomes Related To Skills

<table>
<thead>
<tr>
<th>Observe</th>
<th>Model</th>
<th>Recognize Standards</th>
<th>Correct</th>
<th>Apply</th>
<th>Coach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students translate sensory input into physical tasks or activities.</td>
<td>Students are able to replicate a fundamental skill or task.</td>
<td>Students recognize standards or criteria important to perform a skill or task correctly.</td>
<td>Students use standards to evaluate their own performances and make corrections.</td>
<td>Students apply this skill to real life situations.</td>
<td>Students are able to instruct or train others to perform this skill in other situations.</td>
</tr>
</tbody>
</table>

- **Hear**
  - Identify
  - Observe
  - Attempt
  - Copy
  - Detect
  - Discriminate
  - Check
  - Discover
- **Identify**
  - Learn
  - Recognize
  - Notice
  - Perceive
- **Observe**
  - Notice
  - See
  - Watch
  - Show
  - Try
- **See**
  - Observe
  - Display
  - Watch
  - View
- **Smell**
  - Notice
  - Smell
- **Taste**
  - Taste
- **Touch**
  - Feel
  - Touch
  - Reenact
- **Watch**
  - Watch
  - Show
  - Reproduce

*Usually no outcomes or objectives written at this level.*

### Level

- **Basic Knowledge**
  - Basic Skills
  - Level
- **More Sophisticated Skills**
  - More Sophisticated Skills
  - Higher Level Abilities
  - Critical Understanding of Performance
## Affective Domain

### Learning Outcomes Related To Attitudes, Behaviors, and Values

<table>
<thead>
<tr>
<th>Receiving</th>
<th>Responding</th>
<th>Valuing</th>
<th>Organizing</th>
<th>Characterizing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students become aware of an attitude, behavior, or value.</td>
<td>Students exhibit a reaction or change as a result of exposure to an attitude, behavior, or value.</td>
<td>Students recognize value and display this through involvement or commitment.</td>
<td>Students determine a new value or behavior as important or a priority.</td>
<td>Students integrate consistent behavior as a naturalized value in spite of discomfort or cost. The value is recognized as a part of the person's character.</td>
</tr>
</tbody>
</table>

Accept

Attend

Describe

Explain

Locate

Observe

Realize

Receive

Recognize

Behave

Comply

Cooperate

Discuss

Examine

Follow

Model

Present

Respond

Show

Studies

Accept

Adapt

Balance

Choose

Differentiate

Defend

Influence

Prefer

Recognize

Seek

Value

Adapt

Adjust

Alter

Change

Customize

Develop

Improve

Manipulate

Modify

Practice

Revise

Authenticate

Characterize

Defend

Display

Embody

Habituate

Internalize

Produce

Represent

Validate

Verify

### Elementary Values and Behaviors

- Inherited Value System
- Egocentric View

### More Highly Developed Attitudes

- Well Thought-out Value System
- Higher Level Abilities to Identify and Articulate Others’ Values
Chapter 2: Program Assessment & Student Learning Outcomes
Program Assessment

This section will explore program assessment by beginning with discussing an important fundamental question concerning defining and designing programs. This section will conclude with sample program assessment tools and reports.

Linkage of course outcomes to program and institutional level outcomes is essential. The philosophy behind this website is based upon the concept that training faculty to articulate outcomes and develop assessment practices in their favorite courses will equip them to apply that expertise at program and institutional level assessment. Program assessment is a more comprehensive endeavor and must be clearly focused on learning to produce improvement, rather than a report of the program details which is commonly the extent of Program Review activities. This section begins by looking at things from a different and broader perspective and then working through some of the details of program assessment in community colleges.
When writing program outcomes:

- state the program purpose or mission
- consider other areas or programs that feed into or interact with your program
- analyze community expectations for the program
- survey program descriptors and accomplishments
- review the components of the program and
- determine participant expectations

Defining Programs

The primary requirement for writing SLOs and designing program assessment is a clearly defined program with a written mission statement. Mission statements are not hard to create and the conversations are exceedingly useful.

Programs are often defined by departments and disciplines, or geographic locations, e.g. the biology department, physical science, humanities, the book store, and counseling. Viewing it from the student's perspective a program might be a pathway. For instance, the Bakersfield biology program really contained three pathways which were programs of study ending in or contributing to terminal degrees.

- the pathway or program for biology majors
  - requiring some pre- and co- requisites (math, chemistry, physics)
  - taking numerous interrelated courses with a discipline focus
  - typically transferring to a four year institution
- the biotechnology program
  - requiring pre-requisites
  - taking a lock-step series of courses to prepare for a profession
  - concluding with a vocational program and eventual board exam
- the general education program
  - requiring only collegiate level reading
  - serving as the only science portion to many student's education
  - concluding in a liberal studies degree (potential teachers) or as transfer degree in another discipline field or vocation

A discussion concerning programs must consider cross-disciplinary programs or degrees. Consider cross-disciplinary programs such as Global Studies or PACE which represents a unique, but stimulating challenge, which could greatly benefit students (and is somewhat reminiscent of learning communities).

*Warning: These discussions take time and examine the fabric of institutional organization and governance structures. However, the discussions provide a rationale for why things exist as they do, and an opportunity to review them concerning learning centered strategies. Allow time and be inclusive when examining these issues.*
Writing a Mission Statement for a Community College Program

It is important to begin the process by developing a program mission statement. A mission statement explains what the program goal or goals are in a sentence or two. It is a simple statement that encapsulates the direction or purpose of the program.

Getting started:
These statements are best written with representatives from as many program participants as possible. Students, staff, faculty, and deans should meet to create this statement.

Step 1:
Brainstorm the activities of the program. List what the program does and how it does things. What makes the program unique? Why does this program exist? What are the defining characteristics of this program?

Step 2:
Begin by writing:
who you are
what you do
for whom
and why

For example:
DRAFT Mission statement for the Bakersfield Pre-allied Health Biology program
The pre-allied health biology program prepares students for vocational health programs by providing rigorous courses and hands-on experiences in human biology.

Step 3:
Take this statement and modify it by asking questions.
Does this represent us?
Is this really what we do?
Is this all we do?
Does this include our unique features?
Does this include the aspects that make us successful?
Does everyone involved in the program understand the statement?
Does the statement suggest a vision and mission for the future?

Step 4:
Compare your statement to other mission statements on line or other departments on your campus and modify again. Refine the statement so that it is clear and succinct.

The Bakersfield pre-allied health biology program prepares students for vocational health programs through rigorous coursework, hands-on lab experiences, and relevant field trips in human biology. Students learn to seek out and apply the appropriate information, think critically, develop communication skills, and value others.

Modify the statement often so that it represents your program and the people in it.
Writing Program SLOs

Articulating the program goals, and coordinating the appropriate course SLOs, are important foundations in finalizing draft program SLOs. It is also important to consider external requirements or expectations after a program or course of study. This would include an analysis of: 1) the community or employer expectations, 2) professional standards and expectations, 3) alignment between course, program, and institutional outcomes, 4) student expectations and needs, and transfer institution expectations.
The goal is to explicitly state overarching outcomes that represent skills, knowledge, and abilities the students attain as a result of the program of study. This may include activities beyond course work (field trips, internships, volunteer experiences). Once again the SLO checklist should be useful.

<table>
<thead>
<tr>
<th>Instructional Programs Outcomes</th>
<th>Student Services Programs Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name a specific course or program</td>
<td>Name a specific program or service (e.g. counseling, financial aid, PSSD, Admissions and Records, etc.)</td>
</tr>
<tr>
<td>Are there any prerequisites for this course?</td>
<td>This program must interface with what other key areas?</td>
</tr>
<tr>
<td>Does this course serve as a prerequisite for any other courses?</td>
<td></td>
</tr>
<tr>
<td>Purpose or Mission</td>
<td>Purpose, Mission, or Function that best describes this programs role in student learning:</td>
</tr>
</tbody>
</table>

Regardless of the organization, WASC requirements for General Education (GE) Programs are very explicit and it is important to review the implications of these standards. The next portion of this section involves GE assessment and then returns to traditional program assessment. Skip the next few pages if GE is not a concern for you.
**General Education Program Assessment (Also referred to as Institutional Assessment)**

General Education refers to that course of study often called Liberal Studies or Inter-Disciplinary Studies and represents the majority of AA degrees granted in California Community Colleges and the set of core studies for most discipline specific degrees. Some combinations of these courses are also referred to as CSU Breadth Requirements, IGETC - Intersegmental General Education Transfer Curriculum, or the local institution's general education requirements. (Look in your institution's catalogue for specific courses approved for transfer and degrees.)

General Education requirements often define the unique character of US higher education institutions. Program outcomes will be highly variable depending upon program goals, the community expectations, the student population, and the institutional mission. ACCJC-WASC describes very specific standards which must be present in the core of all GE programs, I have summarized them below - the link in the resource section contains them in detail.

---

**Summary of GE Standards ACCJC-WASC Standard II.A.3.a-c**

The GE program must publicize a philosophy and must include courses as part of the program based upon SLOs.

GE outcomes must include:

1. Basic discipline content and methodology for humanities, fine arts, natural sciences and social sciences.

2. Productive individual and life-long learner skills including oral and written communication, computer literacy, scientific and quantitative reasoning, critical analysis/logical thinking

3. Recognition of ethics and effective citizenry such as: interpersonal skills, appreciation of diversity, historical and aesthetic sensitivity, and civic responsibility.

Exact Standards Language is available at [http://www.accjc.org](http://www.accjc.org)
**Aligning Courses to Program SLOs**

It is helpful to create a course matrix for the program SLOs. After writing SLOs a course matrix will easily identify program courses linked to the Program SLOs. It is also helpful to create a similar matrix displaying the relationship between program SLOs and Institutional or General Education SLOs.

<table>
<thead>
<tr>
<th>Course</th>
<th>SLO1</th>
<th>SLO2</th>
<th>SLO3</th>
<th>SLO4</th>
<th>SLO5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math D</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chemistry 11</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Biology 14</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Biology 15</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Biology 16</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Medical Terminology</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

Examining SLOs using a matrix ensures that students have been introduced to the outcome, had formative feedback, and are summatively assessed concerning successful student learning. This process is somewhat more complicated when looking at GE outcomes across many disciplines, but essential.
Sample Program Assessment Reports

Data from program assessment should be aggregated to protect individual student privacy, individual faculty member's privacy, and individual course sections. The aggregated information is used when preparing unit, department, and institutional assessment reports. Use of the data must be clearly explained. (Will it effect grades, program completion, certificate or degree awards, or only be used for information?)

Program Assessment Reports are most useful when they are aligned with and incorporated into reports that can be integrated into program review and accreditation reports. A program assessment report should include aggregated data and be condensed to minimally include the essential elements shown in the template below.

<table>
<thead>
<tr>
<th>Sample Program Assessment Report Template</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title of Program:</td>
</tr>
<tr>
<td>Program Mission or Goal:</td>
</tr>
<tr>
<td>Student Learning Outcomes:</td>
</tr>
<tr>
<td>Measurement Methods and Processes:</td>
</tr>
<tr>
<td>Data Summary (overview):</td>
</tr>
<tr>
<td>Use of Results (in decision making, curricular changes, etc.):</td>
</tr>
<tr>
<td>Timeline for Program Modifications or Response to Data:</td>
</tr>
<tr>
<td>Appendixes for supporting data</td>
</tr>
</tbody>
</table>

While some of these reports have varying length depending on the amount of supportive data included as evidence and the space required to write the SLOs, the reports are executive summaries of less than one page to a maximum of two pages in length excluding appendixes and Student Learning Outcomes statements.

Some institutions are using a simple table to report on each SLO as shown below.

<table>
<thead>
<tr>
<th>Program Assessment Report</th>
<th>Department:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program SLO</td>
<td>Method of Assessment</td>
</tr>
<tr>
<td>SLO1</td>
<td></td>
</tr>
<tr>
<td>SLO2</td>
<td></td>
</tr>
<tr>
<td>etc</td>
<td></td>
</tr>
</tbody>
</table>

Ultimately the overall report should be focused and indicate evidenced based modifications subsequent to the assessment. Program assessment, like course assessment, should focus on 1 or 2 SLOs per year. It is better to close the cycle on one SLO that to partially complete assessment and reporting for each SLO.
<table>
<thead>
<tr>
<th><strong>Student Learning Outcome Checklist</strong></th>
<th><strong>Yes</strong></th>
<th><strong>No</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Do the SLOs include active verbs?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do the SLOs suggest or identify an assessment?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do the SLOs address the expected level of learning for the course using Bloom’s Taxonomy as a guideline?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do the SLOs address more than one domain (cognitive, psychomotor, and affective)?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are the SLOs written as outcomes rather than as objectives?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Language indicates an important overarching concept versus small lesson or chapter objectives.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Outcomes address what a student will be able to <strong>do</strong> at the completion of the course.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. SLOs address student competency rather than content coverage.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are the SLOs appropriate for the course?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Consistent with the curriculum document of record</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Represents a fundamental result of the course</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Aligns with other courses in a sequence, if applicable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Represents collegiate level work</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Will students understand the SLOs?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comments or suggestions:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assessment Tool Checklist</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Does the assessment adequately evaluate academic performance relevant to the desired outcome? (validity)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Does this assessment tool enable students with different learning styles or abilities to show you what they have learned and what they can do?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Does the content examined by the assessment align with the content from the course? (Content validity)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Does this assessment method adequately address the knowledge, skills, abilities, behavior, and values associated with the intended outcome? (Domain validity)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Will the assessment provide information at a level appropriate to the outcome? (Bloom’s)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Will the data accurately represent what the student can do in an authentic or real life situation? (Authentic assessment)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Is the grading scheme consistent; would a student receive the same grade for the same work on multiple evaluations? (Reliability)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Can multiple people use the scoring mechanism and come up with the same general score? (Reliability)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Does the assessment provide data that is specific enough for the desired outcomes? (alignment with SLO)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Is the assessment summative or formative - if formative does it generate diagnostic feedback to improve learning?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Is the assessment summative or formative - if summative, is the final evaluation built upon multiple sources of data? (AAHE Good practice)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. If this is a summative assessment, have the students had ample opportunity for formative feedback and practice displaying what they know and can do?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Is the assessment unbiased or value-neutral, minimizing an attempt to give desirable responses and reducing any cultural misinterpretations?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. Are the intended uses for the assessment clear? (Grading, program review, both)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Have other faculty provided feedback?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. Has the assessment been pilot-tested?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. Has the evaluation instrument been normed?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18. Will the information derived from the assessment help to improve teaching and learning? (AAHE Good Practice)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19. Will you provide the students with a copy of the rubric or assignment grading criteria?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20. Will you provide the students examples of model work?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Resources


Bers, T. (n.d.) *Assessment at the Program Level*. California Assessment Website at http://cai.cc.ca.us/workshops/Prog Level Assessment by Bers.doc


Southern Missouri State University. *Busy Chairpersons Guide for Departmental Assessment Reporting* at the SMSU website http://www2.semo.edu/provost/assmt/1


**Student Services Program Assessment Resources**

College Student Experiences Questionnaire http://www.iu.edu/~cseq

Community College Survey of Student Engagement http://www.ccsse.org/

Educational Testing Service (ETS) http://www.ets.org


National Survey of Student Engagement (NSSE) http://www.indiana.edu/~nsse

Noel-Levitz http://www.noellevitz.com

The Student Learning Imperative: Implications for Student Affairs http://www.acpa.nche.edu/sli/sli.htm
Chapter 3: Assessment Tools & Data
Assessment Tools and Data

“Classroom assessment is the purest form of assessment-for-improvement, because the information gleaned can be immediately used to improve teaching and learning ...the further away from the individual classroom you get, the harder it becomes to turn assessment data into useable information” (Miller, 1997).

“Post secondary assessment done right must be rooted in the course and in the classroom, in the individual cells, to speak metaphorically, where the metabolism of learning actually takes place” (Wright, 1999).

Defining (and Re-assessing) Assessment: A Second Try

"Assessment is an ongoing process aimed at understanding and improving student learning. It involves
- making our expectations explicit and public;
- setting appropriate criteria and high standards for learning quality;
- systematically gathering, analyzing, and interpreting evidence to determine how well performance matches those expectations and standards; and
- using the resulting information to document, explain, and improve performance.

When it is embedded effectively within larger institutional systems, assessment can help us
- focus our collective attention,
- examine our assumptions, and
- create a shared academic culture dedicated to assuring and improving the quality of higher education."

This section addresses the types of tools and assessment methods which produce valid and reliable data. You may view this section as a smorgasbord of choices. When SLOs are well-written the method or tools for assessment become clear. One size does not fit all, so selecting the appropriate assessment tool requires a basic understanding of: 1) the types of tools available, 2) the nature of data, 3) the process used to select appropriate assessment tools, 4) and the tool's ability to investigate (measure, assess, describe) the observable learning outcome.

Working through this section will assist you in planning for and implementing assessment for the SLOs you have created. This section will describe assessment data and tools as well as compare and contrast the various types of assessment tools relevant to SLOs developed for a course or program.
You may have heard these quotes about statistics and data:

Torture numbers and they'll confess to anything.  
~Gregg Easterbrook

Statistics are like bikinis.  
What they reveal is suggestive, but what they conceal is vital.  
~Aaron Levenstein

Facts are stubborn things, but statistics are more pliable.  
~Author Unknown

There are three kinds of lies - lies, damned lies and statistics.  
~Benjamin Disraeli, commonly misattributed to Mark Twain because he quotes Disraeli in Autobiography (Thank you, Will.)

From the Quote Garden http://www.quotegarden.com/statistics.html
**Quality Data**
In the simplest definition, quality data are based upon best practices, answer important questions, and benefit the students and institution by providing evidence to complete the assessment loop.

**The Assessment Cycle**

![Assessment Cycle Diagram]

The assessment cycle is a data-driven method of decision-making based upon a learning paradigm where questions are posed concerning what works and what does not. To determine the answer to the questions an assessment or investigation is initiated. The investigation generates appropriate data to answer the question. When carried out as an integrated part of the educational process it is often referred to as the scholarship of teaching. By analyzing our teaching methods and learning outcomes, we can improve the process based on information gleaned through assessment, rather than running on intuition. The goal is to create a culture of evidence for institutional decision-making.

In this material, quality data are defined as:

**Valid** - the data accurately represents what you are trying to measure. For instance the numbers of people that graduate don't necessarily represent good data on what has actually been learned.

**Reliable** - the data are reproducible. Repeated assessment yields the same data.

**Authentic** - the assessment simulates real-life circumstances.

**Relevant** - the data answers important questions, and is not generated simply because it is easy to measure.

**Effective** - the data contributes to improving teaching and learning.
Types of Assessment Data and Assessments

These definitions are paired for emphasis and contrast. Skim them now and refer to them if they are needed later.

Evidence of program and institutional outcomes performance.
Quantitative or qualitative, direct or indirect data that provides information concerning the extent to which an institution meets the goals and outcomes it has established and publicized to its stakeholders.

Direct data. Direct data measures the exact value. For instance, a math test directly measures a student's learning in math by defining a criteria and standard, then having the student analyze a problem.

Indirect data. Data that measures a variable related to the intended value. For instance, a person's math skills may be indirectly measured through an employers questionnaire asking about the computational skills of graduating students.

Qualitative data. Data collected as descriptive information, such as a narrative or portfolio. These types of data, often collected in open-ended questions, feedback surveys, or summary reports, are more difficult to compare, reproduce, and generalize. It is bulky to store and to report; however, it is often the most valuable and insightful data generated, often providing potential solutions or modifications in the form of feedback.

Quantitative data. Data collected as numerical or statistical values. These data use actual numbers (scores, rates, etc) to express quantities of a variable. Qualitative data, such as opinions, can be displayed as numerical data by using Likert scaled responses which assigns a numerical value to each response (e.g. 5 = strongly agree to 1 = strongly disagree). This data is easy to store and manage; it can be generalized and reproduced, but has limited value due to the rigidity of the responses and must be carefully constructed to be valid.

Formative assessment. Formative evaluation involves assessment and analysis that generates useful feedback for development and improvement. The purpose is to provide an opportunity to perform and receive guidance (such as in class assignments, quizzes, discussion, lab activities, etc.) that will improve or shape performance on a final or summative evaluation.

Summative assessment. Summative evaluation is a final determination of particular knowledge, skills, and abilities. This could be exemplified by exit or licensing exams, senior recitals, or any final assessment which is not created to provide feedback for improvement, but is used for final judgments.
**Criterion-based assessments.** Assessment evaluated or scored using a set of criteria to appraise or evaluate work. Criterion-referenced evaluation is based on proficiency not subjective measures such as improvement.

**Norm-referenced assessment.** Assessment of an individual is compared to that of another individual or to the same individual’s improvement over time. Individuals are commonly ranked to determine a median or average. This technique addresses overall mastery, but provides little detail about specific skills.

**Embedded assessment.** Embedded assessment occurs within the regular class or curricular activity. Class assignments linked to student learning outcomes through primary trait analysis, serve as grading and assessment instruments. Individual questions on exams can be embedded in numerous classes to provide departmental, program, or institutional assessment information. An additional benefit to embedded assessment is immediate feedback on the pedagogy and student needs.

**Standardized assessment.** Assessments created, tested, and usually sold by an educational testing company e.g. GRE’s, SAT, ACT for broad public usage and data comparison, usually scored normatively.

**Homegrown or Local assessment.** This type of assessment is developed and validated for a specific purpose, course, or function and is usually criterion-referenced to promote validity.

The next section will discuss some of the advantages and disadvantages of standardized assessments as compared to local or homegrown assessments.
Comparing Standardized and Homegrown or Local Assessments

Opinions about standardized testing and local tests are colored by experiences with these tools. Below is a summary comparison of these instruments. There are many types of standardized tests available, everyone is familiar with the SAT and GRE. However, there are discipline specific standardized tests, and standardized tools to collect data on student, faculty, and community perceptions for student services areas. Links in the research section represent fairly opinionated positions for and against standardized testing.

<table>
<thead>
<tr>
<th>Source</th>
<th>Standardized Assessments</th>
<th>Homegrown or Local Assessments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internally created and validated instruments, usually developed by faculty requiring extra time and expertise.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Methodology Face Value</th>
<th>Standardized Assessments</th>
<th>Homegrown or Local Assessments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internally created and validated instruments, usually developed by faculty requiring extra time and expertise.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reporting Format</th>
<th>Standardized Assessments</th>
<th>Homegrown or Local Assessments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internally created and validated instruments, usually developed by faculty requiring extra time and expertise.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Data collection</th>
<th>Standardized Assessments</th>
<th>Homegrown or Local Assessments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internally created and validated instruments, usually developed by faculty requiring extra time and expertise.</td>
<td></td>
<td></td>
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<table>
<thead>
<tr>
<th>Comparability of Data</th>
<th>Standardized Assessments</th>
<th>Homegrown or Local Assessments</th>
</tr>
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<tbody>
<tr>
<td>Internally created and validated instruments, usually developed by faculty requiring extra time and expertise.</td>
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<thead>
<tr>
<th>Assessment Basis</th>
<th>Standardized Assessments</th>
<th>Homegrown or Local Assessments</th>
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<tbody>
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<td>Internally created and validated instruments, usually developed by faculty requiring extra time and expertise.</td>
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<tr>
<th>Domains Evaluated</th>
<th>Standardized Assessments</th>
<th>Homegrown or Local Assessments</th>
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<tbody>
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<td>Internally created and validated instruments, usually developed by faculty requiring extra time and expertise.</td>
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<table>
<thead>
<tr>
<th>Level of information</th>
<th>Standardized Assessments</th>
<th>Homegrown or Local Assessments</th>
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<tbody>
<tr>
<td>Internally created and validated instruments, usually developed by faculty requiring extra time and expertise.</td>
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<thead>
<tr>
<th>Viability in changing fields</th>
<th>Standardized Assessments</th>
<th>Homegrown or Local Assessments</th>
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</thead>
<tbody>
<tr>
<td>Internally created and validated instruments, usually developed by faculty requiring extra time and expertise.</td>
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<table>
<thead>
<tr>
<th>Examples</th>
<th>Standardized Assessments</th>
<th>Homegrown or Local Assessments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internally created and validated instruments, usually developed by faculty requiring extra time and expertise.</td>
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</table>

<table>
<thead>
<tr>
<th>Accountability/ Improvement</th>
<th>Standardized Assessments</th>
<th>Homegrown or Local Assessments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internally created and validated instruments, usually developed by faculty requiring extra time and expertise.</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Other Comments</th>
<th>Standardized Assessments</th>
<th>Homegrown or Local Assessments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internally created and validated instruments, usually developed by faculty requiring extra time and expertise.</td>
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</table>
Grading and Assessment

But how does assessment fit with GRADING?

Paul Dressel (1976) has defined a grade as "an inadequate report of an inaccurate judgment by a biased and variable judge of the extent to which a student has attained an undefined level of mastery of an unknown proportion of an indefinite material." Miller, Imrie, & Cox 1998, p. 24

"An interesting aspect of the GPA is that it tells us very little about what a student knows or what that student’s competencies or talents really are. The GPA is thus primarily a relativistic or normative measure. That is, the primary information contained in a course grade pertains to the student’s performance in relation to other students." Astin, 1993, p. 11

Walvoord and Anderson (1998) in their book Effective Grading suggest that grading, when based upon explicit criteria, can become a structural framework for course embedded assessment. This creates a criterion-referenced and valid means of assessing student learning that occurs in the process of teaching, rather than as an additional task layered upon daily course activities.

Effective Grading Ideas

Make the course assignment-centered. Do not ask, "What should I cover in this course?" but "What should my students be able to do?"

- **Rethink the use of in-class time.** (What wastes your time or the students’ time? Assess the competency of your students at the beginning; some may be lacking in pre-requisite skills)
- **Give students explicit directions for each assignment.** (This saves you time grading and allows students to create a better product.)
- **Determine assessable criteria, use grading scales, checklists, or rubrics that are assignment-specific.** Construct a Primary Trait Analysis (PTA) scale referencing highly explicit criteria and develop rubrics based upon the PTA.
- **Make grading time-efficient.** (Grade things to a certain point in the paper; if the same mistakes are occurring repetitively, draw a line and indicate this is a systemic recurring problem and that you have stopped making specific comments. Use a checklist for simple content or components of assignments, but provide detailed feedback for formative development.)
- **Use authentic types of assignments.**
- **Employ multiple types of assessments.**
- **Address a variety of learning styles.**

In the process of rethinking assignments to make them valid and reliable assessments, faculty grading becomes more efficient and effective, and student performance improves due to the explicit expectations that faculty have articulated. The next sections discuss assignments and exams based upon standards and criteria using primary trait analysis.
Definition: Primary Trait Analysis (PTA) is the process of identifying major traits or characteristics that are expected in student work. After the primary traits are identified, specific criteria with performance standards, are defined for each trait.

On the next page is a flow chart of an example that incorporates a general education outcome (oral communication) within a science specific course-embedded assessment. The assignment is an oral report on a current controversial biological topic. Rather than intuitively grading the oral report specific traits or characteristics are identified.

The primary traits and performance standards should be discussed with other faculty to obtain feedback. Faculty from other disciplines often provide excellent feedback. Healthy discussion validates and clarifies your thinking.

The next step is to develop a rubric used to score the student performance. A rubric is a grading tool used to assign points or values for meeting performance criteria. The rubric will be given to the student when the assignment is announced.

Discuss the primary traits with other faculty for feedback. It is helpful to discuss it with faculty from other disciplines. This validates and clarifies your thinking.

The next step is to develop a rubric. A rubric is a grading tool used to assign points or values for meeting performance criteria.

Rubrics are useful because they help to:

1. Focus instruction on the most important outcomes.
2. Provide diagnostic formative feedback so students can improve.
3. Communicate explicit expectations.
4. Connect the assessment to the assessment increasing validity as an assessment tool.
5. Articulate how scoring is determined; provide a rationale for grading accountability.
6. Produce more consistent and reliable grading.
Give an Oral Report on Genetic Engineering

- Thesis
- Content
- Organization
- Sources
- Delivery

Identify Primary Traits
In this step the major traits or attributes representing best practices are identified.

Identify Criteria for Performance
In this step the criteria which determine how well the student does each trait are innumerate.

The criteria are then weighted for value or points and sometimes defined more specifically. In a science course the content and sources will be more important than the delivery. If this were a speech class, the criteria might be valued very differently.

The traits and criteria are used to determine a scoring rubric or check list.
## Creating a Rubric for an Oral Report in a Science Course

<table>
<thead>
<tr>
<th>Expectations</th>
<th>Excellent 5</th>
<th>Good 4</th>
<th>Average 3</th>
<th>Poor 2</th>
<th>Absent 1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Thesis</strong></td>
<td>clarity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>support</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Content</strong></td>
<td>subject knowledge</td>
<td>alternative opinions</td>
<td>Two or more opposing opinions are described</td>
<td>An opinion differing from the students is described</td>
<td>The student admits others have differing opinions</td>
</tr>
<tr>
<td></td>
<td>currency of data</td>
<td>scientific sophistication</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Organization</strong></td>
<td>attention grabber</td>
<td>supporting arguments</td>
<td>conclusion</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sources</strong></td>
<td>cited correctly</td>
<td>reliability</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Delivery</strong></td>
<td>pronunciation</td>
<td>eye contact</td>
<td>use of visuals</td>
<td>demeanor</td>
<td>content appropriate to audience</td>
</tr>
<tr>
<td><strong>Timing</strong></td>
<td></td>
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</tbody>
</table>

Values – some people describe these, others assign numbers. Performance Criteria – some people make comments or just give checks, others describe each level explicitly.

You may want to vary the weight of some criteria.
Choosing the Right Assessment Tools

Examples of various assessment tools are included in the table below. Evaluate each type of assessment with regards to the type of data generated by the assessment and the pros and cons associated with the assessment. This exercise will stimulate some thought about the pros and cons of each assessment, and review your understanding of the types of data. Answers may vary depending upon your perspective and the way in which you construct the assessment.

<table>
<thead>
<tr>
<th>Assessment Tool</th>
<th>D or I</th>
<th>C, P or A</th>
<th>F or S</th>
<th>Bloom’s</th>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Direct</td>
<td>Indirect</td>
<td>Cognitive, Psychomotor, Affective</td>
<td>Formative or Summative</td>
<td>Knowledge, Comprehension, Application or Analysis/synthesis/evaluation</td>
<td>easy to grade objective reduces assessment to multiple choice answers</td>
</tr>
<tr>
<td>Multiple Choice Exam</td>
<td>D</td>
<td>C</td>
<td>F &amp; S</td>
<td>K, C, A</td>
<td></td>
<td></td>
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<tr>
<td>Licensing Exams</td>
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<tr>
<td>Standardized Cognitive Tests</td>
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<tr>
<td>Checklists</td>
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<tr>
<td>Essay</td>
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<td>Case Study</td>
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<tr>
<td>Problem Solving</td>
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<td>Oral Speech</td>
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<tr>
<td>Assessment Tool</td>
<td>D or I</td>
<td>C, P or A</td>
<td>F or S</td>
<td>Bloom’s K, C, A, ASE</td>
<td>Pros</td>
<td>Cons</td>
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<tr>
<td></td>
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<td>Cognitive, Psychomotor, Affective</td>
<td>Formative or Summative</td>
<td>Knowledge, Comprehension, Application or Analysis/synthesis/evaluation</td>
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<tr>
<td>Debate</td>
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<tr>
<td>Product Creation &amp; Special Reports</td>
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<tr>
<td>Flowchart or Diagram</td>
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<tr>
<td>Portfolios</td>
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<tr>
<td>Performance</td>
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<tr>
<td>Capstone Course</td>
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<tr>
<td>Team Project</td>
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<tr>
<td>Reflective self-assessment essay</td>
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<tr>
<td>Satisfaction or Perception Surveys</td>
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</tbody>
</table>
Choosing the Right Assessment Tools

This section has discussed the use of standardized assessments and local or homegrown assessments. There are advantages to using each depending on the circumstances and the way that they are constructed. Multiple choice questions are often seen as assessing only lower cognitive levels (recall and perhaps comprehension). However you can construct multiple choice questions that require analytical or synthetic thinking.

For example, if I want to see if my students can use the microscope, I can write some higher level thinking multiple choice questions that force the student to solve a problem. For instance,

Imagine that you are observing a malaria smear under the microscope at a total magnification of 1000X. The object appears dark and it is difficult to see the detail of the red blood cells. What is the first step you would take to solve the problem?

a. Check the interface between oil on the slide and the lens.
b. Look at each lens for dirt or smudging.
c. Adjust the position of the diaphragm and light source or condenser.
d. Select another slide with better staining quality.

However, if an outcome of the class is that the students will be able to use a microscope to focus on an object, this question does not authentically test that outcome. The best way to test the outcome is to give the students a slide, have them focus on the object as clearly as they can, write down an identification of an object indicated by the microscope pointer, and then call me over to evaluate their work.

This is also more efficient class management.

- I am able to give the students immediate feedback.
- Students can immediately identify and correct problems.
- I know what the students are capable of doing and how to proceed with the next material.
- Students either feel confident about their ability or know that they must come in for extra help.
- The assessment is graded and returned during the class time.
Create an Assessment Tool

Now it is your turn to select a tool from the previous table, convert something you already use, or create an assignment that could be used for an embedded assessment tool that aligns with one of the SLOs you have written.

1. Look at the SLOs for your favorite course. Do a mini-assessment audit. Are there any assignments, projects, or exams that provide good data on a specific student learning outcome? If not, you may need to create a new assignment. Determine which type of assessment tool best assessed that the student can DO the outcome. This should be authentic; closely resembling a real life experience. Will the student perform a task, create a product, analyze a case study, recite detailed information, or solve a problem?

2. Identify the purpose of the assessment. Will it be formative or summative? If it is formative, how will feedback be given? Will you use it to provide feedback from other students as well as yourself? If summative, has the student had ample practice and feedback to do what is expected?

3. Do Primary Trait Analysis (PTA). Identify the major traits that determine a successful outcome. (For important projects this can be created with the students thus becoming a powerful teaching tool engaging the students and fully informing them about the expectations. Warning - collaborating with students can be time consuming; use this for important or high stakes assignments/assessments.)

4. Describe the criteria relating to the traits and create a checklist, rubric or set of descriptive performance standards. Consider psychomotor, affective and cognitive outcomes. Set criteria at the appropriate level of thinking (Bloom’s taxonomy).

5. Create a grading rubric by weighting the criteria appropriately. Do not include attendance or improvement as a criterion. The criteria should be standards-based, not norm-referenced. Look at samples of artifacts to determine the criteria. Try the rubric out on student work and make appropriate modifications.

6. Use the Assessment Tool Checklist (just after the worksheet) to evaluate the assessment tool you have selected or created. Modify the tool appropriately.

7. Share the tool with other faculty and get feedback.
Creating Graded Assignments as Embedded Assessment Tools

Class or Program:

SLO to be assessed:

What are the primary traits in this assignment that will make it a good assessment of the outcomes?

Describe the assessment; include the instructions for the students.
Is this a formative or summative assessment? If formative how will you provide feedback? If summative, has the student had an opportunity to practice and receive feedback?

What criteria will be used to evaluate the student’s performance? Do not include attendance or improvement as a criterion.

Create a rubric or checklist using the criteria above. What performance standards will you use? Look at professional samples for ideas. Try the rubric out on student artifacts and then modify as needed. Weight the criteria appropriately.
# Assessment Tool Checklist

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>21.</td>
<td>Does the assessment adequately evaluate academic performance relevant to the desired outcome? (validity)</td>
</tr>
<tr>
<td>22.</td>
<td>Does this assessment tool enable students with different learning styles or abilities to show you what they have learned and what they can do?</td>
</tr>
<tr>
<td>23.</td>
<td>Does the content examined by the assessment align with the content from the course? (Content validity)</td>
</tr>
<tr>
<td>24.</td>
<td>Does this assessment method adequately address the knowledge, skills, abilities, behavior, and values associated with the intended outcome? (Domain validity)</td>
</tr>
<tr>
<td>25.</td>
<td>Will the assessment provide information at a level appropriate to the outcome? (Bloom’s)</td>
</tr>
<tr>
<td>26.</td>
<td>Will the data accurately represent what the student can do in an authentic or real life situation? (Authentic assessment)</td>
</tr>
<tr>
<td>27.</td>
<td>Is the grading scheme consistent; would a student receive the same grade for the same work on multiple evaluations? (Reliability)</td>
</tr>
<tr>
<td>28.</td>
<td>Can multiple people use the scoring mechanism and come up with the same general score? (Reliability)</td>
</tr>
<tr>
<td>29.</td>
<td>Does the assessment provide data that is specific enough for the desired outcomes? (alignment with SLO)</td>
</tr>
<tr>
<td>30.</td>
<td>Is the assessment summative or formative - if formative does it generate diagnostic feedback to improve learning?</td>
</tr>
<tr>
<td>31.</td>
<td>Is the assessment summative or formative - if summative, is the final evaluation built upon multiple sources of data? (AAHE Good practice)</td>
</tr>
<tr>
<td>32.</td>
<td>If this is a summative assessment, have the students had ample opportunity for formative feedback and practice displaying what they know and can do?</td>
</tr>
<tr>
<td>33.</td>
<td>Is the assessment unbiased or value-neutral, minimizing an attempt to give desirable responses and reducing any cultural misinterpretations?</td>
</tr>
<tr>
<td>34.</td>
<td>Are the intended uses for the assessment clear? (Grading, program review, both)</td>
</tr>
<tr>
<td>35.</td>
<td>Have other faculty provided feedback?</td>
</tr>
<tr>
<td>36.</td>
<td>Has the assessment been pilot-tested?</td>
</tr>
<tr>
<td>37.</td>
<td>Has the evaluation instrument been normed?</td>
</tr>
<tr>
<td>38.</td>
<td>Will the information derived from the assessment help to improve teaching and learning? (AAHE Good Practice)</td>
</tr>
<tr>
<td>39.</td>
<td>Will you provide the students with a copy of the rubric or assignment grading criteria?</td>
</tr>
<tr>
<td>40.</td>
<td>Will you provide the students examples of model work?</td>
</tr>
</tbody>
</table>
Assessment Examples

Multiple Choice Exams - Many faculty and most standardized tests use the multiple choice format for assessments. The Educational Testing Service uses this for CLEP (College Level Examination Program) and College Level Field Tests etc. [http://www.ets.org/tests/ctest.html](http://www.ets.org/tests/ctest.html)

There are discipline specific standardized multiple choice tests for college credit such as chemistry tests supplied by ETS [http://sydneyplus.ets.org/query.asp?FieldGUID=.ea85e0a4-4f31-4101-818f-01c336e9e4b1&SearchTerm=Chemistry&SearchType=16&CurSort=1&SelField=&mode=public&TemplateGUID=f1273652-1c89-4feb-b4ed-aa5525e2792b&RootTemplateGUID=f1273652-1c89-4feb-b4ed-aa5525e2792b&form_id=&fld_id=&page=1&SubmitBtn=Search&hpp=10](http://sydneyplus.ets.org/query.asp?FieldGUID=.ea85e0a4-4f31-4101-818f-01c336e9e4b1&SearchTerm=Chemistry&SearchType=16&CurSort=1&SelField=&mode=public&TemplateGUID=f1273652-1c89-4feb-b4ed-aa5525e2792b&RootTemplateGUID=f1273652-1c89-4feb-b4ed-aa5525e2792b&form_id=&fld_id=&page=1&SubmitBtn=Search&hpp=10)

In addition many of the entrance or placement tests are multiple choice.

Licensing Exams - There are licensing exams required for numerous professional licenses. For this reason it is appropriate to have assessments simulating these types of exams in a course.

NCLEX (nursing)

X-Ray Board Exams

ASE Automotive Service Excellence Exam

CNA - Certified Nursing Assistant

EMT - Emergency Medical Technician

Standardized Cognitive Tests - GRE, SAT, LSAT, MCAT, Miller's Analogies, Stanford-Binet etc

Checklist - A checklist basically determines whether a criterion is present or not, in contrast to how well or at what performance level. Checklists are good for simple psychomotor skills or low level recall.

<table>
<thead>
<tr>
<th>Hand washing Checklist</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjusted to appropriate water temperature</td>
</tr>
<tr>
<td>Hands wetted</td>
</tr>
<tr>
<td>Soap applied</td>
</tr>
<tr>
<td>Lather worked-up</td>
</tr>
<tr>
<td>Applied cleansing friction of at least 20 seconds</td>
</tr>
<tr>
<td>Applied friction between fingers</td>
</tr>
<tr>
<td>Applied friction on back of hands</td>
</tr>
<tr>
<td>Used fingernail brush for nail beds</td>
</tr>
<tr>
<td>Rinsed off all soap</td>
</tr>
<tr>
<td>Dried appropriately</td>
</tr>
</tbody>
</table>

Other sample checklists are linked below

Web content checklist (scroll down) [http://www.w3.org/TR/1999/WAI-WEBCONTENT-19990505/full-checklist.html](http://www.w3.org/TR/1999/WAI-WEBCONTENT-19990505/full-checklist.html)

Web page evaluation http://www.lib.berkeley.edu/TeachingLib/Guides/Internet/EvalForm.pdf

Study Skill Checklist http://www.ucc.vt.edu/stdysk/checklis.html

Skills Checklist for immunizations with values included https://www.immunize.org/catg.d/2020skill.pdf

Case Study & Problem Solving

Case studies use an "in situ" approach to simulate real life situations and problems. The National Center for Case Study Teaching in Science is a good example of pre-packaged assessments and assignments that can be adapted in a variety of courses http://ublib.buffalo.edu/libraries/projects/cases/case.html

Also checkout Engineering case studies http://www.civeng.carleton.ca/ECL/

and ethics case studies http://ethics.sandiego.edu/resources/cases/HomeOverview.asp

Problem Solving uses the same approach but may leave more developmental problem solving to the student. For instance, the student must develop the experiment or tests to obtain data. Rice University has a great collection of these. http://www.ruf.rice.edu/~lane/rvls.html

University of Delaware has sample problems
http://edweb.sdsu.edu/clrit/learningtree/PBL/webassess/WebAssessmentHome.html

Samford University has a website describing PBL - Problem based learning
http://www.samford.edu/pbl/definitions.html

SDSU has a site on assessing problem based learning
http://edweb.sdsu.edu/clrit/learningtree/PBL/webassess/WebAssessmentHome.html

Team Projects

This is another term for collaborative projects, either within the course, in conjunction with other courses, or with community partners. It uses collaborative learning to assess multiple levels of understanding and application. Many of the assessments above can be conducted in teams or collaboratively. There is, however, a difference between collaborative and cooperative.

http://www.cpcs.umb.edu/partners_projects/partners_projects_collaborations.htm

Flowchart or Diagram

A flowchart is a visual or graphic illustration of a process or system used to solve a problem or produce a product. Cognitive researchers have said that placing information in a flowchart or diagram represents one of the highest levels of cognitive achievement requiring analysis and synthesis of many concepts. Flowcharts are excellent ways to communicate the logic involved in a system; students must recall the appropriate information and associated content but must also analyze how the components fit with the entire system or process. Flow charts allow students the opportunity to gain confidence in their ability to describe the entire system or process. Follow-up case study questions concerning the system or process, involving potential problems or adaptations, allow the students to use the flowchart to evaluate system changes.
Directions for this type of assessment must be very specific.

1. Describe a process using a flowchart or diagram. A flowchart is a visual or graphic illustration of a process or system used to solve a problem or produce a product.
2. Chart the process the way it really occurs.
3. Prepare a single lined title for the flowchart or diagram that adequately describes the process being described.
4. Begin with an event that initiates the process.
5. Record each succeeding action or reaction clearly identifying its relationship to the process.
6. Use standard symbols for reoccurrences
7. If multiple stimulators or multiple consequences occur, try to include these.
8. Make notes or reference anything that needs explanation and any assumptions that are not evident.
9. Determine and end point or whether the process is cyclic and draw it in this way.
10. Run through the flowchart to be sure you have not left anything out and that it flows in the way you have drawn it.

W.E. Deming, the quality guru is reported to have said, ""Draw a flowchart for whatever you do. Until you do, you do not know what you are doing, you just have a job." In the same way we might tell our students to draw a flow chart, until they do they have only memorized factoids.

Portfolios

Portfolios are a collection of student artifacts over a period of time.

http://webcenter1.aahe.org/electronicportfolios/index.html

Sample of a digital portfolio for students
http://www.hpcnet.org/upload/attachments/TheDAT_392877_20031103082323.doc

Numerous samples of portfolios for student grading are found at
http://www.aahe.org/teaching/pfolios3.cfm

Capstone

A capstone is defined as a culminating event or crowning achievement. Capstone Courses or Projects are high stakes courses or projects integrating multidisciplinary education with a problem or course. These are usually a requirement for transferring or graduating students. Capstones are good opportunities to evaluate programs.

Example of capstone projects in General Education http://genedhonors.binghamton.edu/projdes.html

Capstone Course in Education
http://www.wgu.edu/wgu/smartcatalog/class_description.asp?course_key=7033

Sample Capstone Projects http://www.unomaha.edu/~wwwpa/project/prevsemesters.html
Reflective Self-Assessment Essay

These types of essays ask the students to assess their own growth and development using evidence to support their conclusions.

An example of this kind of essay is given below. This essay is from a multidisciplinary capstone class in Advanced Composition and Critical Thinking taught by four instructors at Bakersfield College. The assignment is

Satisfaction or Perception Surveys

There are numerous commercial standardized assessments available to gather data on student, faculty, staff, employer, and community satisfaction or perceptions. Examples are the CCSSE and NSSE on student engagement

Noel-Levitz SSI (Student Satisfaction Inventory)

CSEQ College Student Experiences Questionnaire
Resources


http://pareonline.net/getvn.asp?v=5&n=2

California Assessment Institute at http://cai.cc.ca.us/


http://www.fairtest.org/facts/Limits of Tests.html

Fair Testing Website. *University Testing: Fact Sheets*
http://www.fairtest.org/univ/univfactsheets.htm


Leskes, A. (2002). *Beyond Confusion: An Assessment Glossary.* At the AACU website
http://www.aacu.org/peerreview/pr-sp02/pr-sp02reality.cfm

Levisque, Bradby, Rossi, MPR Associates (1996). Using Data from Program Improvement: How Do We Encourage Schools To Do It? http://ncrve.berkeley.edu/CenterFocus/CF12.html

Math League (2001). *Elementary, help with data and statistics*
http://www.mathleague.com/help/data/data.htm


http://www.ericfacility.net/databases/ERIC_Digests/ed385607.html and PAREonline


Chapter 4: Why Assessment? History, Background, and Definitions
What is Assessment?

Assessment is the means to improve curriculum, make pedagogy more effective, challenge students to take ownership of their own learning, and produce deeper learning. New research in cognitive science (how people know things) is rapidly expanding; assessment helps implement these principles into classroom pedagogy. In addition, many fields of study, such as Biochemistry and Microbiology, are literally exploding with new information. Assessment provides a tool to incorporate current aspects of the discipline yet keep teaching focused.

Assessment in higher education involves four important processes:

- identifying clear, valid, and appropriate student learning outcomes
- collecting evidence that those outcomes are being addressed
- dialogue to attain a collective interpretation of the data
- using data to improve both teaching and learning

Defining Assessment: The Accrediting Commission for Community and Junior Colleges, ACCJC-WASC, which accredits colleges in California, Hawai‘i, and the Pacific Region, defines assessment as “the methods that an institution employs to gather evidence and evaluate quality” (http://www.accjc.org).

Student Learning Outcomes (SLOs) are statements which define what a student should be able to do after the completion of a course or program. The SLO defines what will be measured and dictates what assessment tool is appropriate. SLOs represent both the target for our service or teaching and the expectation for student achievement as a result of our effort. Assessment information tells us what students can do and how well they have learned as a result of a course or program. It informs us about the effectiveness of our pedagogy. Assessment data provides a culture of evidence which is the foundation for modification in teaching or service and further revisions to SLOs.

At first glance, assessing outcomes may appear threatening, because we are not miracle workers: not all students will succeed. Some students do not care and some do not try. However, we know that many students do learn, do care, and do pass our courses and complete programs. These are the students we want to engage most effectively. How can we improve the quality of learning that occurs for the majority of students in our programs and courses? It begins by using evidence (data) to make those improvements. The process of articulating desired outcomes, assessing those outcomes, and using the data for improvement, is called the assessment life cycle.
Assessment Cycle*

While the Assessment cycle is continuous, as we engage in this ongoing process, we will begin with Developing Student Learning Outcomes.

* Student Learning
  - Develop, modify, or review curriculum, course, program, or service.
  - Develop or modify Student Learning Outcomes (SLOs)
  - Design & Measure Student Learning as a result of the Curriculum, Course, or Program
  - Collect, discuss, and analyze data.
  - Determine course or program refinements based on outcomes data.
Why Assessment?

The literature describes three main purposes for assessment.

- Assessment for accountability
- Assessment to improve learning
- Assessment as a tool for learning

Annually billions of public tax dollars are invested in higher education based upon the belief that education is a key factor in the health and economics of any country, state, or individual. However public demands for accountability have resulted in major concerns about the quality of American higher education. In 1983 a U.S. Department of Education report called *A Nation at Risk* proclaimed,

> “Our Nation is at risk. Our once unchallenged preeminence in commerce, industry, science, and technological innovation is being overtaken by competitors throughout the world. This report is concerned with only one of the many causes and dimensions of the problem, but it is the one that undergirds American prosperity, security, and civility. We report to the American people that while we can take justifiable pride in what our schools and colleges have historically accomplished and contributed to the United States and the well-being of its people, the educational foundations of our society are presently being eroded by a rising tide of mediocrity that threatens our very future as a Nation and a people. What was unimaginable a generation ago has begun to occur--others are matching and surpassing our educational attainments.

>*If an unfriendly foreign power had attempted to impose on America the mediocre educational performance that exists today, we might well have viewed it as an act of war. As it stands, we have allowed this to happen to ourselves. We have even squandered the gains in student achievement made in the wake of the Sputnik challenge. Moreover, we have dismantled essential support systems which helped make those gains possible. We have, in effect, been committing an act of unthinking, unilateral educational disarmament.”* (National Commission on Excellence in Education, 1983, p. 5)

Subsequent to this report and further fueled by rising costs in higher education, external measures to ensure quality education were adopted and in some states legislated. These external pressures for accountability came in several forms: changes in accreditation standards, new tougher expectations by grant funding agencies, and the genesis of performance-based funding by state legislative bodies.
Accountability

In 1998, the California Legislature, in partnership with the California Community College Chancellor's office, legislated performance-based funding for the California Community College system called Partnership for Excellence (PFE). Performance-based funding requires output in order to gain input (funding). The output identified by PFE was increased performance on the following statistical data:

- numbers of transfer students
- degrees and certificates
- successful course completions
- completed workforce development training
- improvement in basic skills

"The Partnership for Excellence program is hereby established for the purpose of achieving annual performance goals and improving student learning and success."
SEC. 35. Section §84754 Education Code

California was not alone, nor the originator of this funding for performance accountability. By 2000 over 37 states had legislated performance-based funding, clearly communicating the public desire for educational accountability. However, none of these legislated measures have proven successful in improving education. In fact, in some cases the effort to increase statistical measures actually placed a negative pressure on the quality of education. (See the California Academic Senate link at the right for a critique of PFE.) While performance-based funding was new to the general fund budget, assessment and accountability were not new to higher education. Grant funded initiatives and vocational programs have been producing assessment data for years to justify funding and improve effectiveness. (note: This act is scheduled to be changed or sunset in January, 2005).

Unlike the lukewarm effectiveness of performance-based funding, two influential statewide initiatives changed the educational landscape for all components of higher education in California community colleges in 2002. The new ACCJC-WASC Accreditation Standards and the California Master Plan for Education both incorporated expectations for student learning outcomes (SLOs) and assessment plans in every course and program in California community colleges (ACCJC-WASC, 2002; California Master Plan for Education, 2002). Compared to the relatively ineffectual legislated pressures which largely addressed institutional and administrative level responsibilities, these accreditation requirements drove accountability and assessment to the level of faculty-student interaction and the classroom. This mandated faculty involvement or risked the potential for mandated external assessment as occurred in the K-12 California System. Interestingly, WASC was one of the last accrediting associations to adopt standards that focused on student learning outcomes for accreditation, but the most specific concerning the role faculty must play.

The underlying motivation for these external requirements for accountability was to improve the quality of education. However, mandates will do little to actually create learning-centered improvement in education unless the assessment loop was closed.
Why Assessment? Educational Improvement through Accreditation

“Accreditation is the primary means by which the quality of higher education institutions and programs is assured in the United States”
(Council for Higher Education Accreditation, CHEA).

One of the goals of these external measures was to create an environment that continuously addressed quality - a philosophy reminiscent of TQM (total quality management) and CQI (continuous quality improvement). These business terms raised faculty hackles and stimulated vitriolic debate. Business quality, for instance in manufactured products, is usually maintained by careful control of both the components and the process used to create the product. In business, explicit specifications delimit the component parts used; strict protocols determine processes; and rigorous standardized testing provides the final data concerning the product quality. This rigid standardization is not the type of quality that can improve American higher education; it would destroy the variety and uniqueness highly valued in American individuals. Students are not components acquired using explicit specifications and run through a learning process controlled like manufacturing. The challenge to guarantee both quality and diversity has infused and shaped the type of quality control efforts in education.

Can education improve? Are we satisfied with only anecdotal reports? Should we guarantee that coursework is relevant and adequately current to meet a rapidly changing global environment? As faculty we will often complain about the lack of preparation characterized by incoming students and wonder who will do something about this. Naturally we can not assume that our efforts alone are as good as they can get; we can also not expect the public to simply take our word for the quality of education. As educational costs increase and demands for accountability increase, how will we guarantee quality, yet retain the individuality of American Higher Education?

U.S. higher education institutions are characterized by unique and individualized missions and values. The raw ingredients, from the students to the faculty and curriculum vary tremendously. Fostering heterogeneity and individuality, while maintaining quality, has been accomplished through a process of peer review called accreditation.

Specific criteria that represent quality education are enumerated as Accreditation Standards by regional accrediting bodies. Accreditation is a peer review process that guarantees an institution actually does what it professes to the public it will do. The review validates that there is evidence to prove that colleges and universities meet basic standards through existing institutional structures and functions. (For more detailed information check out the links on the right.) Accreditation is a public stamp of approval which influences which students select to attend, what funding sources will invest in which institutions, and the recognition or transferability of an institution’s courses, degrees, or certificates.

Accreditation creates a cycle of review and improvement based upon campus-wide dialogue and a culture of evidence produced through assessment processes.
ACCJC-WASC Accreditation

“What is accreditation?”
“Accreditation is a status granted to an educational institution that has been found to meet or exceed stated criteria of educational quality. Institutions voluntarily seek accreditation and it is conferred by non-governmental bodies.

Accreditation has two fundamental purposes:
- to assure the quality of the institution and to assist in the improvement of the institution.

Accreditation of an institution by an institutional accrediting body certifies to the general public that the institution:
- has appropriate purposes.
- has the resources needed to accomplish its purposes.
- can demonstrate that it is accomplishing its purposes.
- gives reason to believe it will continue to accomplish its purposes.”

This material is taken directly from the ACCJC-WASC website http://www.accjc.org

For more information on accreditation, look at Council for Higher Education Accreditation http://www.chea.org and the accrediting region for your area. The Western Association of Schools and Colleges is WASC, which has a special section for Community and Junior Colleges ACCJC-WASC at http://www.accjc.org

Most faculty are NOT motivated to do assessment as a result of external requirements such as accountability or even internal peer review through accreditation.

The major reason faculty are motivated to do assessment is the ability to improve student learning, because assessment equips faculty to measure outcomes and adjust the input for those outcomes through calculated improvements. Assessment allows faculty to figure out what works in their classroom and what does not work.
Why Assessment? Educational Improvement

“Post secondary assessment done right must be rooted in the course and in the classroom, in the individual cells, to speak metaphorically, where the metabolism of learning actually takes place” (Wright, 1999).

“Classroom assessment is the purest form of assessment-for-improvement, because the information gleaned can be immediately used to improve teaching and learning ...the further away from the individual classroom you get, the harder it becomes to turn assessment data into useable information” (Miller, 1997)

Classroom assessment data has unique features which make it especially useful for producing immediate and palpable improvement in learning. Classroom assessment can:

• guide teaching that targets appropriate levels of Bloom's taxonomy and deep versus superficial learning.
• provide immediate feedback, the most powerful method known for improving learning.
• develop a conduit for diagnostic feedback to adjusting pedagogy effectiveness.
• motivate faculty and students and invigorate professional dialogue.
• link educational tracks and goals into a cohesive pathway for students.
• move the institution towards the learning paradigm.

Assessment practices specifically target appropriate learning.

The learning theory paradigm powerfully impacted accreditation standards shifting validation of higher education activities from inputs (finances, library books, curriculum, etc) to output, student learning outcomes. This orientation necessitates a review to determine what type of cognitive, psychomotor, and affective learning needs to be produced in the student. Consideration of assessibility of outcomes and expectations influences the design of programs and curriculum. Some faculty have found that the objectives or goals written for courses and programs in the past often focused 1) what they were going to cover not what the student would be able to do, and 2) on knowledge or comprehension, rather than more complex levels of thinking. Indeed, some courses should address primarily knowledge and basic skills levels, however some faculty have found the assessment process useful in helping them incorporate outcomes that address higher order thinking skills more directly. In addition it is expected that general education courses are include a
component of critical thinking requiring analysis, synthesis, and evaluation.

Interrelationships between Bloom’s cognitive levels

- **Analysis**
  The ability to break up information logically

- **Synthesis**
  The ability to create something new

- **Evaluation**
  The ability to evaluate usefulness for a purpose

- **Application**
  The ability to apply learning to a new or novel task

- **Comprehension**
  The ability to show a basic understanding

- **Knowledge**
  The ability to recall what has been learnt

Assessment and Diagnostic Formative Feedback

Assessment creates diagnostic formative feedback to improve student learning.

The diagnostic information produced through assessment creates a conduit to significantly improve learning through corrective feedback. Black and Wiliam (1998) conducted an extensive meta-analysis of over 250 articles in order to analyze data documenting the effect of formative assessment. The evidence of their analysis was impressive; formative assessment yielded effect sizes of between 0.4 and 0.7, improving education, more than any other educational intervention.

"An effect size of 0.4 would mean that the average pupil involved in an innovation would record the same achievement as a pupil in the top 35% of those not so involved. An effect size gain of 0.7 in recent international comparative studies in mathematics would have raised the score of a nation in the middle of the pack of 41 countries (e.g. the U.S.) to one of the top five." (Black and Wiliam, p. 141)

Stiggins (2002) interpreted the effect gains from the Black and Wiliam's research as the equivalent of moving student performance an average gain of 30 percentile points, two letter grades, or 100 points on the SAT scale. This degree of improvement is unprecedented in education by any means of innovative strategies or methods described in the literature. These data indicate the importance of classroom activities linked to assessment and formative feedback. Faculty-driven, classroom-based assessment focused on learning, produces a dynamic feedback loop between faculty and students that energizes the learning environment and produces tangible improvements in education.


Assessment and the Learning Paradigm

Assessment represents a vehicle for shifting an institutional culture to the learning paradigm.

This is described by Barr and Tagg (1995) in the following excerpt From Teaching to Learning: A New Paradigm for Undergraduate Education.

"Subtly but profoundly we are shifting to a new paradigm: A college is an institution that exists to produce learning. This shift changes everything. It is both needed and wanted. We call the traditional, dominant paradigm the Instruction Paradigm. Under this paradigm colleges have created complex structures to provide for the activity of teaching conceived primarily as delivering 50-minute lectures—the mission of a college is to deliver instruction. Now, however, we are beginning to recognize that our dominant paradigm mistakes a means for an end. It takes the means or method-called "instruction" or "teaching"—and makes it the college's end or purpose. To say that the purpose of colleges is to provide instruction is like saying that General Motors' business is to operate assembly lines or that the purpose of medical care is to fill hospital beds. We now see that our mission is not instruction but rather that of producing learning with every student by whatever means work best. The shift to a "Learning Paradigm" liberates institutions from a set of difficult constraints." (1995, p.13)

Simply incorporating new programs and activities into traditional institutions falls far short of the new paradigm. O’Banion (1997b) defined six key principles upon which a learning college is based these included:

- institutional commitment to substantive change in the learners,
- learner accountability as full partners
- institutional dedication to diverse learning options
- student participation in collaborative learning
- re-defining of faculty roles and staff roles according to learning needs
- evidence of success documented by learning outcomes.

Assessment provides both the data to validate and the feedback to transform into a learning-centered institution.
Assessment Prompts Learning

In an alternative perspective to that dreaded question, “Will this be on the test?” Boud (1995a) suggested that assessment prompts learning. In other words, faculty provoke deep learning with appropriate types of challenging assessment methods, or conversely, develop rote memory and recall via assessment methods. Student learning is guided not only by what we test, but also by how we test. If we ask for simple recall, students will study and regurgitate; if we ask for synthetic, evaluative and analytical questions, their studying must address this.

Assessment can help faculty address learning using new cognitive research information.

New technology and recent research concerning how people learn has provided important information about the brain that can enhance classroom pedagogy and improve learning. The following information is excerpted from Knowing What Students Know by the National Research Council.

- Students come to class with pre-conceptions that must be engaged or they will fail to grasp new concepts and information, or they will learn new information for a test only to revert to preconceptions outside of class.
- Students develop competence in an area when they have: (a) a deep factual knowledge, (b) understand the facts within a conceptual framework, and (c) organize knowledge so that they can retrieve and apply it.
- Students that take control of their own learning, through a metacognitive approach (monitoring their own goals and progress in achieving them) are able to achieve deep and permanent learning.
- Assessment represents an essential component for improving teaching and learning but it must target proficiency of content and metacognitive skills.
- An important role for assessment is timely, informative feedback to facilitate practice and acquisition of proficiency of skills and deep learning. Assessment should reveal the development of knowledge and skills to allow formative improvement, not just summative judgment, if it is to improve teaching and learning.
- Technology represents a unique opportunity to engage knowledge
Other Definitions of Assessment

ACCJC-WASC defines assessment as the methods that an institution employs to gather evidence and evaluate quality.  ACCJC-WASC Commission Standards, 2002, p. 29

Assessment is an ongoing process aimed at understanding and improving student learning. It involves making our expectations explicit and public; setting appropriate criteria and high standards for learning quality; systematically gathering, analyzing, and interpreting evidence to determine how well performance matches those expectations and standards; and using the resulting information to document, explain, and improve performance. When it is embedded effectively within larger institutional systems, assessment can help us focus our collective attention, examine our assumptions, and create a shared academic culture dedicated to assuring and improving the quality of higher education. (Angelo, 1995b, p.7).

I shall consider assessment to include the gathering of information concerning the functioning of students, staff, and institutions of higher education. The information may or may not be in numerical form, but the basic motive for gathering it is to improve the functioning of the institution and its people. I use functioning to refer to the broad social purposes of a college or university: to facilitate student learning and development, to advance the frontiers of knowledge, and to contribute to the community, and the society. (Astin, 1993, p.2)

Educational assessment includes all of the data-gathering and evaluative processes that allow us to understand teaching and learning. (Tanner, 2001, p. 17)
Deep Learning

New research in neurobiology has contributed to greater understanding of how people store and use knowledge. This evidence actually builds on Bloom's Taxonomy which categorizes types of knowledge and the way it is used ranging from simple recall to more complex synthetic or analytic processes.

Faculty are familiar with superficial and deep learning. Superficial learning involves rote memory and recall. Students often limit the extent of their studying to techniques that involve flashcards, lists, or definitions of course content and sometimes remain unskilled in relating that material to important concepts from other disciplines or using that material to make judgments in everyday life. Deep learning is characterized by useful knowledge, knowledge that can be used to construct and synthesize new understanding. Zull (2003), an educator and neurobiologist, describes in his book, The Art of Changing the Brain: Enriching the Practice of Teaching by Exploring the Biology of the Brain, the biological aspects of the brain relate to learning. Long term learning requires the development of new neuronal connections and changes in synapses. The realization that deep learning entails physical and biologic processes should influence the way we teach. Zull describes factors involved in driving material beyond the superficial recall level, through deeper parts of the brain, in order to improve learning. The book cover at the bottom of the page is connected to a detailed review of the material in the book and the publishers website if you wish to purchase the book. I would HIGHLY recommend it.

In addition to Zull's book, the National Research Council has produced several books which describe the biology and pedagogy involved in "knowing". These books explore the details involved in transforming from a novice, concerning particular information, to an expert. Research data and practical suggestions about pedagogy and assessment make these texts very valuable as you begin to develop and understanding of assessment. These texts can be read online for free or purchased by clicking on the link attached to the book cover below. I have quoted information excerpted from the NRC websites describing how these books provide knowledge and assessment tools related to deep learning.

How People Learn: Brain, Mind, Experience, and School: Expanded Edition (2000) "this book offers exciting new research about the mind and the brain that provides answers to a number of compelling questions. When do infants begin to learn? How do experts learn and how is this different from non-experts? What can teachers and schools do-with curricula, classroom settings, and teaching methods-to help children learn most effectively? New evidence from many branches of science has significantly added to our understanding of what it means to know, from the neural processes that occur during learning to the influence of culture on what people see and absorb. How People Learn examines these findings and their implications for what we teach, how we teach it, and how we assess what our children learn. The book uses exemplary teaching to illustrate how approaches based on what we now know result in in-depth learning. This new knowledge calls into question concepts and practices firmly entrenched in our current education system." Quoted from the National Academy Press website at http://books.nap.edu/catalog/9853.html
Knowing what Students Know: The Science and Design of Educational Assessment (2001) This book is a "cutting-edge work on the following topics: (1) assessment practices that are based on cognitive principles and are being successfully implemented in schools and classrooms, (2) new statistical models with promise for use in assessing a broad range of cognitive performances, (3) programs that engage students in self- and peer assessment, (4) innovative technologies for learning and assessment, (5) cognitively based instructional intervention programs, and (6) policy perspectives on new forms of assessment." Quoted from the National Academy Press website at http://books.nap.edu/catalog/9853.html
Chapter 5: What is Program Assessment
The purpose of this chapter…
This chapter will help you think about assessment in terms of how it can benefit you and other members of your department or program. Assessment is about improvement, and program assessment can help you focus on improving student learning in your classes and in the major.

What is assessment?
Why assess?
What is program assessment?
What are the steps to effective program assessment?
Are other research universities/colleges using program assessment?

What is Assessment?
The word “assessment” has taken on a variety of meanings within higher education. The term can refer to the process faculty use to grade student course assignments, to standardized testing imposed on institutions as part of increased pressure for external accountability, or to any activity designed to collect information on the success of a program, course or College curriculum. These varied uses have, unfortunately, moved us away from a focus on the central role that assessment should play in educational institutions – the gathering of information to improve institutional practices.

Therefore, the purposes of this handbook...
Assessment is the systematic collection and analysis of information to improve student learning.

Defined in this manner, assessment asks you to think about the following questions:
What should students be learning and in what ways should they be growing?
What are students actually learning and in what ways are they actually growing?
What should you be doing to facilitate student learning and growth?
Why Assess?...To Improve Student Learning

The fact is during her recent visit to the faculty assess all the time in their classes and in their programs. You are constantly considering what worked well and what didn’t, and using those observations and impressions to make changes in your curriculum. What formal assessment (like the type discussed in this handbook) does is make those informal activities more systematic and more public.

Assessment can facilitate improvement through a variety of venues. When faculty members are directly involved in the development, implementation, and analysis of assessment activities, a number of specific benefits can result.

<table>
<thead>
<tr>
<th>Potential Benefits of Assessment:</th>
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<tbody>
<tr>
<td><strong>Because Assessment can provide information, knowledge and skills, students have as they enter a course</strong></td>
<td>Faculty Members Can design instruction to target the knowledge and skills levels students should have upon finishing a course and better determine the levels of thinking of reasoning appropriate for the course.</td>
</tr>
<tr>
<td><strong>Because Assessment can provide reliable data on student learning and information from student evaluations</strong></td>
<td>Faculty Members Can rely less on the comments that appear on student evaluations as indicators of success in teaching.</td>
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<tr>
<td><strong>Because students can make available richer data about the effects of the curriculum or teaching methods</strong></td>
<td>Faculty Members Can engage in more productive conversations about the status of student achievement and make better decisions about how it might be improved</td>
</tr>
<tr>
<td><strong>Because Assessment can yield more reliable data about instruction</strong></td>
<td>Faculty Members Can make reliable decisions about innovations or experimental projects in instruction and share successes more easily.</td>
</tr>
<tr>
<td><strong>Because Assessment can provide evidence that faculty make a difference in student learning</strong></td>
<td>Faculty Members Can enjoy greater satisfaction in their work as educators.</td>
</tr>
<tr>
<td><strong>Because Assessment can offer a larger view of student needs and accomplishments</strong></td>
<td>Faculty Members Can identify directions for future instructional development.</td>
</tr>
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adapted from the University of Nebraska-Lincoln Teaching and Learning Center, Teaching at UNL, Vol. 21, No. 2. (Oct. 1999).
Effective program assessment helps you answer three questions:

1. What are you trying to do?
2. How well are you doing it?
3. How (using the answers to 1. and 2.) can you improve?

Effective program assessment is generally

- **Systematic.** It is an orderly and open method of acquiring information over time.
- **Built around the department mission statement.** It is an integral part of the department or program.
- **Ongoing and cumulative.** Over time, assessment efforts build a body of evidence to improve programs.
- **Multi-faceted.** Assessment information is collected on multiple dimensions, using multiple methods and sources.
- **Pragmatic.** Assessment is used to improve the campus environment, not simply collected and filed away.
- **Faculty-designed and implemented,** not imposed from the top down.

adapted from California State University, Chico, Assessment Plan (1998) and the Ball State University, Assessment Workbook (1999).

Assessment activities can also serve external needs by:

*Providing data to create a body of evidence for external accreditation and the on-campus program review* requirements and to support your assertions about your department’s successes and strengths.
What are the steps to effective program assessment?

Ultimately, you will tailor your program assessment approach to respond to departmental goals and timelines, taking into account internal expectations, external requirements, or both. In general, however, your department will want to complete the following steps to develop an effective program assessment plan:

Checklist to better learning:

- Agree on your mission
- Create goals for student outcomes and processes
- Identify related activities for each goal
- Brainstorm appropriate measures
- Evaluate and select measures
- Identify appropriate assessment methods
- Develop a plan for collecting data
- Prioritize goals
- Set timeline, milestones
- Implement assessment plan
- Use data to improve processes
- Communicate results

adapted from Hatfield, Susan, Department Level Assessment: Promoting Continuous Improvement (1992).

Are other research universities using program assessment?

The advantages of assessment for academic programs are recognized and accepted at colleges and universities across the country. There are many programs at institutions finding ways to use formal department and institution-wide assessment to improve practice.
Chapter 6: Defining Goals and Objectives
The purpose of this chapter... Successful program assessment begins with a clear sense of what the program is designed to accomplish. To begin, define department/program goals and objectives or what it is you want students who complete the major in your department to know, understand, and be able to do when they graduate. When you have identified your program’s goals and objectives, you can begin to assess how well these goals and objectives are being met.

Chapter 6
At A Glance

What are program goals?
- Program Goals
- Developing program goals
- Where do you start?
- How do you write effective program goals and objectives?

What are Program Goals and Objectives?

Developing an effective assessment plan begins with being clear about what program faculty are trying to accomplish. A clear statement of learning goals and objectives serves as the foundation for the entire plan - shaping the kinds of questions you will ask, the assessment methods you will employ, and determining how useful your assessment results are for making programmatic changes. Just like the term “assessment,” there are varying definitions of “goals.” For consistency and ease of understanding as you work through this handbook, the following terms will be used as defined:

**Goals** describe broad learning outcomes and concepts (what you want students to learn) expressed in general terms (e.g., clear communication, problem-solving skills, etc.).

**Objectives** broader goals are the specific skills, values, and attitudes students should exhibit that reflect the broader goals (e.g., for students in a freshman writing course, this might be “students are able to develop a cogent argument to support a position”)


80
**Program Goals**

Developing program goals – where do you start?

Developing agreed upon program-specific student learning goals is not always a quick and easy task. Departments vary in the extent to which the faculty share a common disciplinary framework or epistemology. When departments hold many subfields, specialties, or perspectives, identifying agreed upon goals may be more difficult than in departments where there is a unified approach to the discipline.

Before actually writing or revising departmental goals and objectives, try some of the following activities:

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<thead>
<tr>
<th>Have open discussions with department faculty on one of the following topics or similar topics</th>
<th>Review and react to goals and objectives from another unit that is similar but external</th>
</tr>
</thead>
<tbody>
<tr>
<td>Describe the ideal students in your program at various phases throughout your program. Be concrete and focus on those strengths, skills, and values that your feel are the results of, or at least supported and nurtured by the program experience.</td>
<td>Try grouping the statements into broad categories of student outcomes (e.g., knowledge, attitudes, behavior).</td>
</tr>
<tr>
<td>Then ask: -What does this student know? -What can this student do? -List and briefly describe the program experiences that contribute most to the development of the ideal student.</td>
<td>Use the 25 percent problem to refine and reduce a set of goal statements</td>
</tr>
<tr>
<td>List the achievements you implicitly expect of graduates in each major field.</td>
<td>Imagine that you want to reduce program or course material by 25 percent. What goals would you keep and which would you discard?</td>
</tr>
<tr>
<td>Describe your alumni in terms of such achievements as career accomplishments, lifestyles, citizenship activities, and aesthetic and intellectual involvement.</td>
<td>Administer a goals inventory or conduct an interview study</td>
</tr>
<tr>
<td>Collect and review instructional materials</td>
<td>Involve a variety of groups (or stakeholders) when possible</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Collect and review instructional materials</th>
<th>Use a Delphi technique or modification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Try sorting materials by the type of learning each one is designed to promote: recognition/recall, comprehension/simple application, critical thinking/problem-solving. Use any of the following: -Syllabi and course outlines -Course assignments and tests -Textbooks (especially the table of contents, introductions and summaries)</td>
<td>Choose an impartial facilitator to mediate a panel discussion about possible program goals. In a brainstorming session, ask each panel member to build a list of criteria that he or she thinks is important to program goals. For each criterion, have each member anonymously rank it as: 1-very important, 2-somewhat important; or 3-not important. Place the criteria in rank order and show the (anonymous) results to the panel. Discuss possible reasons for items with high standard deviation. Repeat the ranking process among the panelists until the panel can reach consensus. The objective is to reach consensus before writing goals and objective.</td>
</tr>
</tbody>
</table>

**Collect and review documents that describe your department and its programs**

- Brochures and catalogue descriptions
- Accreditation reports
- Curriculum committee reports
- Mission statements
How do you write program goals?

Again, goals describe broad learning outcomes and concepts (what you want students to learn) expressed in general terms (e.g., clear communication, problem-solving skills, etc.). These goals can focus on general outcomes for graduates as well as discipline-specific outcomes relevant to the department or program itself. Examples include:

“Students should develop a critical understanding of a significant portion of the field of psychology.”

“Students who complete the degree major in Organizational Communication should feel that it is important to exercise ethical responsibility in their communication with others.”

“Students will develop an understanding of important concepts and methods in the sciences.”

“Students will obtain mastery of higher order objectives (i.e. problem solving skills) in discipline.”

“Students will develop skills useful to functioning as a professional in their field of study.”

It is generally a good idea to identify between three and five instructional goals for your program. However, if you and other members of your department can agree on only one goal, don’t let this stall your progress. Focus on that one goal – more will come later.

Program Objectives

Developing program objectives – where do you start?

Program objectives transform the general program goals you developed above into specific student performance and behaviors that demonstrate student learning and skill development along these goals.

Before drafting objectives, it might be helpful to consider these three questions, which focus on objectives in slightly different ways:

■ For each of your state goals, what are the specific student behaviors, skills, or abilities that would tell you this goals is being achieved?

■ Ideally and briefly, what would a skeptic need (evidence, behavior, etc.) in order to see that your students are achieving the major goals you have set out for them?

■ In your experience, what evidence tells you when students have met these goals – how do you know when they’re “getting” it?

Types of Objectives

There are three types of learning objectives, which reflect different aspects of student learning:

<table>
<thead>
<tr>
<th>Cognitive Objectives</th>
<th>“What do you want your graduate to know?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Affective Objectives</td>
<td>“What do you want your graduates to think or care about?</td>
</tr>
<tr>
<td>Behavioral Objectives</td>
<td>“What do you want your graduates to be able to do?</td>
</tr>
</tbody>
</table>
Levels of Objectives

Objectives can also reflect different levels of learning

- **Mastery Objectives** reflect minimum competencies within the discipline – those skills that must be mastered by the student before moving on to the next level of instruction. Mastery objectives tend to be very specific and limited in scope and, therefore, can often be articulated with great specificity (Palomba, et. al., 1999).

For example, all accounting students should be able to: Balance a financial statement; Prepare an Excel spreadsheet; Track accounts receivable

- **Developmental Objectives** reflect more complex (or higher order) learning outcomes – those learning tasks on which students can be expected to demonstrate varying degrees of progress. Note that these developmental objectives are often written in a two-stage process in which the general objective is stated along with a sample of specific learning outcomes.

For example, accounting students might also be expected to: Understand Generally Accepted Accounting Practices (GAAP); Explain GAAP in layman’s terms; Name one or two of these practices; Discuss the difference between accepted and non-standard practices; and Give an example of when to use and reference GAAP.

In this case, the objective for the student is to understand GAAP. While some students may demonstrate all four of the learning outcomes associated with this objective, some may only demonstrate three, and some only one.

How do you write program objectives?

When writing program objectives, describing realistic and achievable outcomes in simple language. Even if a learning objective that is important to you seems difficult to measure, try to word the objective into language that focuses on student behavior.

Effectively worded objectives:

- Use action verbs that describe definite, observable actions:
- Include a description under which the action takes place: “when given x, the student will be able to...”
- Indicate an appropriate level of competency that is assessable through one or more indicators.


Program objectives should be accepted and supported by members of the department. Developing appropriate and useful objectives is an interactive process; it’s not unusual to go back a number of times to refine objectives. In most cases, it is only when you try to develop assessment techniques for program objectives that the need for refining objectives becomes apparent.
Noteworthy

Bloom’s Taxonomy is a well-known description of levels of educational objectives. It may be useful to consider this taxonomy when defining your objectives. You can also use the Objectives Worksheet in Appendix 6-A at the end of this chapter to help you match your goals to specific objectives.

<table>
<thead>
<tr>
<th>Level</th>
<th>Cognitive Behaviors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Knowledge</td>
<td>to know specific facts, terms, concepts, principles, or theories</td>
</tr>
<tr>
<td>2. Comprehension</td>
<td>to understand, interpret, compare and contrast, explain</td>
</tr>
<tr>
<td>3. Application</td>
<td>to apply knowledge to new situations, to solve problems</td>
</tr>
<tr>
<td>4. Analysis</td>
<td>to identify the organizational structure of something; to identify parts, relationships, and organizing principles</td>
</tr>
<tr>
<td>5. Synthesis</td>
<td>to create something, to integrate ideas into a solution, to propose an action plan, to formulate a new classification scheme</td>
</tr>
<tr>
<td>6. Evaluation</td>
<td>to judge the quality of something based on its adequacy, value, logic or use</td>
</tr>
</tbody>
</table>

WORD POWER

Adapted from CSU, Bakersfield, PACT Outcomes Assessment Handbook (1999).

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Comprehension</th>
<th>Application</th>
<th>Analysis</th>
<th>Synthesis</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>define</td>
<td>classify</td>
<td>apply</td>
<td>analyze</td>
<td>arrange</td>
<td>appraise</td>
</tr>
<tr>
<td>identify</td>
<td>describe</td>
<td>compute</td>
<td>appraise</td>
<td>assemble</td>
<td>assess</td>
</tr>
<tr>
<td>indicate</td>
<td>discuss</td>
<td>construct</td>
<td>calculate</td>
<td>collect</td>
<td>choose</td>
</tr>
<tr>
<td>know</td>
<td>explain</td>
<td>demonstrate</td>
<td>compare</td>
<td>compose</td>
<td>compare</td>
</tr>
<tr>
<td>label</td>
<td>express</td>
<td>dramatize</td>
<td>contrast</td>
<td>construct</td>
<td>contrast</td>
</tr>
<tr>
<td>list</td>
<td>identify</td>
<td>employ</td>
<td>criticize</td>
<td>create</td>
<td>decide</td>
</tr>
<tr>
<td>memorize</td>
<td>locate</td>
<td>give examples</td>
<td>debate</td>
<td>design</td>
<td>estimate</td>
</tr>
<tr>
<td>name</td>
<td>paraphrase</td>
<td>illustrate</td>
<td>determine</td>
<td>formulate</td>
<td>evaluate</td>
</tr>
<tr>
<td>recall</td>
<td>recognize</td>
<td>interpret</td>
<td>diagram</td>
<td>manage</td>
<td>grade</td>
</tr>
<tr>
<td>record</td>
<td>report</td>
<td>investigate</td>
<td>differentiate</td>
<td>organize</td>
<td>judge</td>
</tr>
<tr>
<td>relate</td>
<td>restate</td>
<td>operate</td>
<td>distinguish</td>
<td>perform</td>
<td>measure</td>
</tr>
<tr>
<td>repeat</td>
<td>review</td>
<td>organize</td>
<td>examine</td>
<td>plan</td>
<td>rate</td>
</tr>
<tr>
<td>select</td>
<td>suggest</td>
<td>practice</td>
<td>experiment</td>
<td>prepare</td>
<td>revise</td>
</tr>
<tr>
<td>underline</td>
<td>summarize</td>
<td>predict</td>
<td>inspect</td>
<td>produce</td>
<td>score</td>
</tr>
<tr>
<td></td>
<td>tell</td>
<td>schedule</td>
<td>inventory</td>
<td>propose</td>
<td>select</td>
</tr>
<tr>
<td></td>
<td>translate</td>
<td>shop</td>
<td>question</td>
<td>set-up</td>
<td>value</td>
</tr>
<tr>
<td></td>
<td>use</td>
<td>sketch</td>
<td>relate</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix 6-A
Objectives Worksheet

This worksheet may help you and others in your department develop specific instructional objectives from the goals you have identified. Have all faculty members complete the following table. Meet as a group to discuss your response and try to reach consensus on desired objectives and outcomes. Remember that an **objective** is the **specific learning behavior that the student should demonstrate** in the context of achieving the goal. You may end up with more than one objective for each goal.

<table>
<thead>
<tr>
<th>Program Goals</th>
<th>Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>a.</td>
</tr>
<tr>
<td></td>
<td>b.</td>
</tr>
<tr>
<td></td>
<td>c.</td>
</tr>
<tr>
<td>2.</td>
<td>a.</td>
</tr>
<tr>
<td></td>
<td>b.</td>
</tr>
<tr>
<td></td>
<td>c.</td>
</tr>
<tr>
<td>3.</td>
<td>a.</td>
</tr>
<tr>
<td></td>
<td>b.</td>
</tr>
<tr>
<td></td>
<td>c.</td>
</tr>
<tr>
<td>4.</td>
<td>a.</td>
</tr>
<tr>
<td></td>
<td>b.</td>
</tr>
<tr>
<td></td>
<td>c.</td>
</tr>
<tr>
<td>5.</td>
<td>a.</td>
</tr>
<tr>
<td></td>
<td>b.</td>
</tr>
<tr>
<td></td>
<td>c.</td>
</tr>
</tbody>
</table>
Chapter 7: Designing the Assessment Program
The purpose of this chapter...

Clarifying the content and focus of an assessment plan is an essential step in developing your own. By understanding what is included in an assessment plan and looking at what you already have in place, you can begin to focus on how to put together an effective assessment program for your department. In addition, you can decide what to add to existing assessments and become aware of the challenges to assessment design. The sample assessment plans at the end of the chapter illustrate one way you might approach this task.

Chapter 7
At A Glance

What does an assessment plan include?

The end result of your assessment design will be an effective and workable assessment plan. It can be a formal document to distribute both inside and outside the department, or an informal schedule for department use only, depending on the purpose of the assessment activity.

In designing your plan, consider and include the following:

<table>
<thead>
<tr>
<th>Learning Goals and Objectives</th>
<th>What will the student in the major know, value and be able to do upon graduation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning Processes</td>
<td>To what learning experiences and strategies will students be exposed to achieve these learning objectives?</td>
</tr>
<tr>
<td>Assessment Methods</td>
<td>By what measure(s) will you know that students are meeting departmental learning objectives? From whom, and at what points, will you gather data? How will the information be collected?</td>
</tr>
<tr>
<td>Assessment Processes</td>
<td>When will you conduct the assessment? Who will be responsible for each component? What is the overall timeline for the assessment plan?</td>
</tr>
<tr>
<td>Status, Outcomes and Results</td>
<td>What did you find out? How do the data support these findings?</td>
</tr>
<tr>
<td>Decisions, Plans and Recommendations</td>
<td>Based on your findings, what do you plan to do now?</td>
</tr>
</tbody>
</table>

adapted from California State University, Chico, Assessment Plan (1998).

noteworthy Sample assessment plans are included in Appendix 7-A at the end of this chapter.
What is already in place?

The most effective departmental assessment plan is one that is closely linked to the curriculum and uses available information and resources to the greatest degree possible. Before designing additional assessment components it’s important to document how the current curriculum matches the goals and learning objectives you have identified and to inventory what assessment related information/processes are already in place that you can draw upon.

Curriculum Mapping: Linking goals/objectives to the curriculum
Curriculum mapping makes it possible to identify where within the current curriculum your departmental learning objectives are addressed. Below is the framework for a matrix that might be helpful to you in identifying these links between intended outcomes and curricular processes. Along the top of the matrix, list all the courses and other requirements/options (internships service learning, theses, etc.) for the major. Along the side, list your departmental objectives. Then indicate which of the objectives are addressed in each of the requirements/options (you could also go into more detail and identify in which courses these objectives are Introduced, Emphasized, Utilized, and assessed comprehensively as shown in the first row).

Assessment Matrix: Linking Objectives to Curriculum

Key
I = Introduced
E = Emphasized
U = Utilize
A = Comprehensive Assessment

More on Curriculum Mapping

Curriculum mapping provides an inventory of the link between your objectives and the curriculum. It can also serve as a catalyst for discussions about the proper sequencing of courses, the degree to which the curriculum really supports student learning, and the extent to which core objectives are appropriately addressed within the curriculum. Discussing the link between learning objectives and the curriculum may lead to a more general conversation about how processes within the major facilitate or hinder accomplishment of program goals. You may find the following questions helpful in framing that discussion:

- **What are the processes (e.g., course, activities, practica) under your control that contribute to meeting your goals and objectives?**
- **Are there processes that don't contribute to your goals?**
- **Are there processes in which you should be engaged to attain your goals?**
- **Are there resources not under the control of your program that might assist you in improving student learning (e.g., general education, related minor program, courses offered outside the major, library holdings, or other support services for students)?**

adapted from the Western Carolina University, Assessment Resource Guide (1999).

Such a departmental conversation can also be very helpful in identifying the key program components, particularly in need of assessment. (For example, are there key points in the curriculum where it is particularly important to gauge student progress?) Revisit these questions after collecting assessment information – the assessment data should further inform your initial responses.

Inventory of Current Assessment Practices

Instructors and departments are already assessing student learning through a variety of methods including grades, competency exams, capstone courses, etc., though you may not call them “assessment.” Before designing a department assessment program, it is important to identify what assessment information you are already collecting and match these data sources to the learning goals and objectives you outlined in Chapter 2.

An assessment matrix is a particularly useful way of linking goals and objectives to assessment tools, program requirements or course curricula. The example on the following page shows a set of departmental objectives down the first column of the matrix and, along the first row, different sets of information currently available at the department level.

In this matrix, the link between objectives and data sources is identified in two ways – **direct** measures of the objectives (D) and **indirect** measures (I).

**Direct methods** “require students to display their knowledge and skills as they respond to the instrument itself. Objective tests, essays, presentations, and classroom assignments all meet this criterion.”

**Indirect methods** such as surveys and interviews ask students to reflect on their learning rather than to demonstrate it? (Palomba and Banta, 1999, pp. 11-12).
Assessment Matrix: Linking Objectives to Data Gathering Tools

**Key**
I = Indirect Methods  
D = Direct Methods

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Enrollment Trends (OIR)</th>
<th>Senior Survey (OAPA)</th>
<th>Capstone Assignment</th>
<th>Focus Groups with Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apply scientific method</td>
<td></td>
<td></td>
<td>D</td>
<td>I</td>
</tr>
<tr>
<td>Work as professional in field</td>
<td>I</td>
<td>D</td>
<td></td>
<td>I</td>
</tr>
</tbody>
</table>

**What should you add?**

Once you have identified assessment processes that are currently in place, you can pinpoint central questions that are not being answered by your currently available data sources. For example, does your department currently collect direct measures of the learning objectives? (Unfortunately, for many departments, the information that best reflects learning objectives is kept at the course level – department level analyses/synthesis of student learning is rarely done.)

Also, pay attention to points in the student experience where information collection is most easily accomplished. For example, courses required for the major (those courses that all students in the major take) are ideal opportunities to collect systematic information from students. Embedding assessment activities into the curriculum for these courses and making them "count" toward the student’s final grade will facilitate successful data gathering.

**What can you assess?**

A key part of deciding on what assessment methods to use is knowing what you want to assess. In general, you will look at assessing student learning, student attitudes and perceptions, and/or department processes. The following offers examples for each category.

**Student Learning**
Knowledge of the discipline (What do students know?)  
Skills (What can students do?)  
Values (What do students care about?)

**Student Attitudes and Perceptions about:**
Advising  
Campus facilities  
Course Scheduling  
Preparation for work or University
Mentoring  
Teaching

**Departmental Processes. Are students served efficiently and effectively when they need services such as:**
Advising  
Library assistance  
Computer assistance  
New student orientations
Counseling  
Financial Aid  
Transcripts
Graduation checks  
Tutoring  
Health care
What are the challenges to assessment design?

As departments work to identify and design assessment methods to measure goal and objective attainment in the program, a variety of challenges and complications will emerge:

**Acknowledge differences between units.**
Even programs within the same department may have different goals specific to that program. Assessment measures that work well in one unit may not be as successful in another. The key is to design or identify assessment techniques that are specific to the goal that you are assessing.

**Allow time for mistakes and for ongoing faculty input and discussion.**
Pilot projects are excellent ways to try out new techniques to see how well they assess the goal or outcome you are trying to measure. Encourage and set time aside for faculty meetings to discuss assessment techniques and methods so that faculty both invest in the process and see how assessment is connected to the learning that goes on in their classrooms.

**Tie the assessment methodology and instruments to the purpose of the assessment.**
Differences among units and the need to experiment are only two challenges you may face. You will also want to avoid the common error of designing or identifying an assessment technique, then fitting a purpose or goal to it.

**Address the issues of participant attrition/retention, the actual amount of time involved, and cost and/or resources.**
Longitudinal studies are particularly vulnerable to these challenges. Any effective assessment plan will acknowledge these challenges and incorporate ways to address them within the development and implementation of the plan itself.
Appendix 7-A
Sample Assessment Plans

SAMPLE
Department of Anthropology University of Colorado at Boulder
PROGRAM ASSESSMENT USING COURSE-BASED ASSESSMENT OF CLASSROOM ASSIGNMENTS

BA in Anthropology

1. Goals
Students are expected to know and be aware of
- basic methods, concepts, alternative theories and approaches, and modes of explanation appropriate to each of the three main subfields of the discipline;
- basic archaeological techniques, as well as human history from its beginning through the emergence of complex societies;
- variation, patterning, and creativity in human social behavior and symbolic systems.

2. Objectives
identify trends or patterns in anthropological data;
formulate a testable explanation or reasonable interpretation;
identify data that constitute credible evidence for an explanation or interpretation;
identify and define a significant problem or topic in anthropology; and
analyze and interpret data in a systematic manner.

3. Outcomes Criteria
Completion by a random sample of 15% of the senior majors of identified course assignments in selected upper division anthropology courses.

4. Assessment Methods
A cross-section of written work involving several formats and the department’s three subdisciplines, including take-home essays, literature critiques, midterm essay, and final exams.

5. Time Frame
Senior majors will take the courses proposed and will complete the identified assignments for these courses. Evaluation of the assignments will be scheduled as appropriate throughout the semester.

6. Who Will Do the Assessment?
Assignments will be read and evaluated independently by three faculty members other than the course instructor and ranked on a five-point scale with 5 as superior and 1 as inadequate.

7. Type of Feedback.
At the end of each evaluation, faculty will submit their evaluations, data will be compiled and areas of strength/weakness will be identified.

8. How data will be used to improve program or revise curricula
The department will meet as a whole to discuss findings and will recommend to the Chair methods for improving curricula based on the assessment.
Appendix 7-A
Sample Assessment Plans

SAMPLE
Department of Chemical Engineering University of Colorado at Boulder PROGRAM ASSESSMENT USING NATIONAL STANDARDIZED EXAM

BS in Chemical Engineering

1. Goals
The undergraduate degree in chemical engineering requires knowledge and awareness of:
- mathematics beyond trigonometry, emphasizing mathematical concepts and principles;
- general chemistry, organic chemistry, physical chemistry, and general physics;
- the engineering sciences that have their origins in mathematics and the basic sciences;
- the iterative decision-making process in which basic sciences, mathematics, and engineering sciences are applied to convert resources to meet project objectives;
- humanity and culture; and individual relationships in and to society.

2. Objectives
Students will demonstrate the ability and skill to:
- delineate and solve in a practical way the problems of society involving molecular change;
- implement the engineer’s responsibility to protect both occupational and public health/safety;
- maintain professional competency through lifelong learning;
- conduct experimental investigations that combine elements of theory and practice;
- use computational techniques to solve specific engineering problems; and
- communicate effectively both orally and in writing.

3. Outcomes Criteria
Successful completion of national standardized Fundamentals of Engineering Exam (FE) by all graduating seniors.

4. Assessment Methods
   - analysis of overall FE exam scores in comparison with national and state scores
   - analysis of FE exam scores by engineering major
   - analysis of course content in relation to exam subject areas and scores

5. Type of Feedback
   - review of test data by faculty committees within each department of the College to determine percentages of students passing/failing the exam
   - evaluation of College curricula and course content in relation to areas of the exam on which students receive lower scores

6. How data will be used to improve program or revise curricula
Data will be used to update curricula and course content to address identified problem areas. A senior design project is currently being considered to increase hands-on experience and practical application of learning.
Appendix 7-A
Sample Assessment Plans

SAMPLE
Department of English California State University - Santa Barbara
PROGRAM ASSESSMENT USING SENIOR CAPSTONE PROJECT

BA in English

1. Goal
Students are expected to be familiar with major writers, periods and genres of English and American Literature and to be able to place important works and genres in their historical context.

2. Objectives
- Discuss a major work or author in English and/or American Literature, or compare two or more works and authors; for example, analyze the character of Satan in Milton’s Paradise Lost.
- Analyze a novel, short story, poem, play or a significant piece of prose showing familiarity with the techniques and literary contexts of the particular genre examined.
- Show knowledge of the historical context or literary period of the work or author being examined; for example, a discussion of Crane’s Maggie as an example of American Naturalism.

3. Outcomes Criteria
Completion of a Senior Project consisting of a portfolio of four papers and a reflective essay demonstrating that the student has met a substantial number of the objectives outlined above in “Objectives.”

4. Assessment Methods
Portfolios reviewed and evaluated by departmental committee.

5. Time Frame
Students will take the course proposed and will prepare the portfolios before the end of the senior year. Evaluation of the portfolios will be scheduled for each quarter.

6. Who Will Do the Assessment?
Department Chair and appointed committee.

7. Type of Feedback.
At the end of each evaluation, the committee will write a report describing the strengths and weaknesses that the portfolios demonstrate.

8. How data will be used to improve program or revise curricula
The department will meet as a whole to discuss findings and will recommend to the Chair and curriculum committee methods of improving department procedures and curricula.
Appendix 7-A
Sample Assessment Plans

SAMPLE
Department of Mathematics University of Colorado at Boulder
PROGRAM REVIEW USING COURSE-BASED ASSESSMENT OF EMBEDDED EXAM QUESTIONS

BA in Mathematics

1. Goals
Students are expected to know and be aware of:
- basic real analysis of one variable;
- calculus of several variables and vector analysis;
  the structure of mathematical proofs and definitions; and
  at least one additional specialized area of mathematics.

2. Objectives
   - use techniques of differentiation and integration of one and several variables;
   - solve problems using differentiation and integration;
   - solve systems of linear equations;
   - give direct proofs, proofs by contradiction, and proofs by induction;
   - write a simple computer program

3. Outcomes Criteria
Completion of embedded exam questions designed to evaluate selected knowledge and skills.

4. Assessment Methods
Test questions developed by a committee of faculty and embedded in the mid-term and final exams of three upper level classes: Calculus 3, Linear Algebra, and Advanced Calculus.

5. Time Frame
Students will take the courses proposed and will complete the mid-term and final exams for these courses. Evaluation of the exam questions will be scheduled at semester's mid-point and end.

6. Who Will Do the Assessment?
Members of the departmental Undergraduate Committee, independent of the course instructors, will grade questions for outcomes assessment. The Department Chair and an appointed committee will review the Undergraduate Committee's report.

7. Type of Feedback.
At the end of each evaluation, the committee will write a report describing the results and making recommendations for curricular revision, if appropriate.

8. How data will be used to improve program or revise curricula
The department will meet as a whole to discuss findings and will recommend to the Chair methods for improving curricula based on exam question assessment.