Faculty Workshop on Assessing Program Outcomes

Gloria Rogers, Ph.D.
Associate Executive Director,
Professional Services
ABET, Inc.
Objective:
At the conclusion of the workshop participants will have:
- An overview of the assessment process,
- Developed measurable learning outcomes,
- Developed scoring rubrics,
- Reviewed curriculum mapping,
- Reviewed twelve assessment methods,
- Identified direct and indirect measures,
- Discussed validity of assessment methods,
- Reviewed systematic data collection,
- Discussed reporting results,
- Reviewed an assessment matrix.

Agenda:

8:30 AM – 9:00 AM  Introductions/Expectations

9:00 AM – 9:30 AM  Review of the Assessment process—putting the pieces together

9:30 AM—10:15 AM  Developing Measurable Performance Criteria – The Missing Link

10:15 AM – 10:30 AM  BREAK

10:30 AM – 10:50 AM  Report Out

10:50 AM – 11:45 AM  Writing Scoring Rubrics

11:45 AM—12:45 PM  LUNCH

12:45 PM – 1:10 PM  Report Out on Rubrics

1:10 PM—2:45 PM  Assessment Tools Exercise

2:45 PM  BREAK

3:00 PM – 3:30 PM  Report Out on Assessment Methods

3:30 PM – 3:45 PM  Developing Efficient Processes

3:45 PM—4:00 PM  Reporting Results

4:00 PM – 4:30 PM  Wrap-up/Plus DELTA’s

5:00 PM  Workshop Adjourns
Faculty Workshop on Assessing Program Outcomes

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Foundational Truths

✓ Programs are at different places in the maturity of their assessment processes
✓ Programs have different resources available to them (e.g., number of faculty, availability of assessment expertise, time)
✓ Each program has faculty who are at different places in their understanding of good assessment practice

Hierarchy of assessment learning

Evaluation
Synthesis
Analysis
Application
Comprehension
Knowledge

Advanced
INTERMEDIATE
NOVICE

I can take what I have learned and put it in context. I begin to question what I hear, challenge assumptions and make independent decisions about effective practices for my program.

I apply what I have learned and begin to analyze the effectiveness of my assessment processes.

Everyone who makes a presentation is an expert and I am a sponge.

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### Input Processes Outputs Outcomes

<table>
<thead>
<tr>
<th>Student Background</th>
<th>Programs &amp; services offered; populations served</th>
<th>Student grades; graduation rates; employment statistics</th>
<th>Student learning, skills, attitudes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faculty Background</td>
<td>Faculty teaching loads/class size</td>
<td>Credit hours delivered, faculty development activities; publication numbers</td>
<td>Faculty publication citations data; faculty devlpmt</td>
</tr>
<tr>
<td>Educational Resources</td>
<td>Policies, procedures, governance</td>
<td>Statistics on resource availability, participation rates</td>
<td>Student learning and growth</td>
</tr>
</tbody>
</table>

✓ Assessment of inputs and process only establishes the capability or capacity of a program (how many courses and what is "covered", background of faculty, nature of facilities, etc.)

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✓ Assessment of outputs serve as indirect measures or proxies for effectiveness—they provide general indicators of achievement.

<table>
<thead>
<tr>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student grades; graduation rates; employment statistics</td>
</tr>
<tr>
<td>Credit hours delivered; faculty development activities; publication numbers</td>
</tr>
<tr>
<td>Statistics on resource availability, participation rates</td>
</tr>
</tbody>
</table>

✓ Assessment of outcomes provides for direct measures of the effectiveness of what has been done with that capability/capacity related to individual learning and growth.

<table>
<thead>
<tr>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student learning, skills, attitudes</td>
</tr>
<tr>
<td>Teaching effectiveness; faculty development; research productivity; publications citations</td>
</tr>
<tr>
<td>Student learning and growth</td>
</tr>
</tbody>
</table>
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Taxonomy of Approaches to Assessment

- **Competency-Based Instruction**
  - Assessment-Based Curriculum
  - Individual Perf. Tests

- **Placement**
  - Advanced Placement Tests
  - Vocational Preference Tests
  - Other Diagnostic Tests

- **"Gatekeeping"**
  - Admissions Tests
  - Rising Junior Exams
  - Comprehensive Exams
  - Certification Exams

- **Program Enhancement**
  - Individual assessment results may be aggregated to serve program evaluation needs

- **Learning/Teaching**
  - (Formative)

- **Accountability**
  - (Summative)

(Terenzini, JHE Nov/Dec 1989)

<table>
<thead>
<tr>
<th>ABET Terms</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program Educational Objectives</td>
<td>Broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve.</td>
</tr>
<tr>
<td>Program Outcomes</td>
<td>Statements that describe what students are expected to know and able to do by the time of graduation.</td>
</tr>
<tr>
<td>Performance Criteria</td>
<td>Specific, measurable statements identifying the performance(s) required to meet the outcome; confirmable through evidence.</td>
</tr>
<tr>
<td>Assessment</td>
<td>Processes that identify, collect, use and prepare data that can be used to evaluate achievement.</td>
</tr>
<tr>
<td>Evaluation</td>
<td>Process of reviewing the results of data collection and analysis and making a determination of the value of findings and action to be taken.</td>
</tr>
</tbody>
</table>

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Similarities and differences between classroom and program assessment
Classroom Assessment

Context:
- Subject matter
- Faculty member
- Pedagogy
- Student
- Facility

Assessment Focus:
- Evaluate individual student performance (grades)
- Evaluate teaching/learning

Timeline 1 semester/quarter

Evaluation
- Synthesis
- Analysis
- Application
- Comprehension
- Knowledge

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Differences between classroom and program assessment

✓ Degree of complexity
✓ Time span
✓ Accountability for the assessment process
✓ Cost
✓ Level of faculty buy-in
✓ Level of precision of the measure

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Developing measurable outcomes

Program Educational Objective

Students will demonstrate:
- an ability to identify, formulate, and solve engineering problems
- Ability to function effectively on a team

Learning Outcome

Performance Criteria

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### Program Educational Objective

Graduates will be able to demonstrate ability to solve complex biomedical engineering problems and participate in a team-based environment.

### Performance Criteria

- Researches and gathers information
- Fulfills duties of team roles
- Shares in work of team
- Listens to other teammates

### Learning Outcome

- Ability to function on a team

### Please rate each member of the team on the following scale:

<table>
<thead>
<tr>
<th></th>
<th>Unsatisfactory</th>
<th>Developing</th>
<th>Satisfactory</th>
<th>Exemplary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Score</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

- Researched and gathered information
- Fulfilled team role's duties as assigned
- Shared in work of team
- Listened to other teammates' points of view

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Developing performance criteria

- Two essential parts
  - Content referent
    - Subject content that is the focus of instruction (e.g., steps of the design process, chemical reaction, scientific method)
  - Action verb
    - Direct students to a specific performance (e.g., "list," "analyze," "apply")

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Clarity of performance criteria

- Use of action verbs consistent with appropriate level of learning
- Reference table

Choose one outcome

1. An ability to conduct, analyze and interpret experiments and apply experimental results to improve processes
2. A recognition of the need for, and an ability to engage in lifelong learning
3. An ability to understand professional and ethical responsibilities
4. A respect for diversity
5. A knowledge of contemporary professional, societal and global issues
6. A commitment to quality, timeliness, and continuous improvement

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Importance of well-stated performance criteria

- Provides faculty with clear direction for implementation in the classroom
- Makes expectations explicit to students (great pedagogy)
- Focuses data collection

www.engrng.pitt.edu/~ec2000/

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Developing scoring rubrics
Introduction

- What is a rubric
- How does it fit into the assessment process
- What is its relationship to performance criteria
- What are the different types of rubrics
- Making choices
- How to apply rubrics
- Things you should know as you develop rubrics

What is a rubric?

- "Rubrics" are a way of explicitly stating the expectations for student performance. They may lead to a grade or be part of the grading process but they are more specific, detailed, and disaggregated than a grade.
- Rubrics provide the exact characteristics for each level of performance on which student performance should be judged.
- The rubric provides those who have been assessed with clear information about how well they performed and a clear indication of what they need to accomplish in the future to better their performance.
What is a rubric?

- Rubrics generally contain three components:
  - Dimensions (performance criteria),
  - Scale (levels of performance),
  - Descriptors
## Communication Skills

<table>
<thead>
<tr>
<th>Performance Criteria</th>
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<th>Performance Criteria</th>
<th>Performance Criteria</th>
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<tr>
<td>Exemplary 4</td>
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<td></td>
</tr>
<tr>
<td>Satisfactory 3</td>
<td></td>
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<tr>
<td>Developing 2</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Unsatisfactory 1</td>
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</tbody>
</table>

### Dimensions

### Scales

### Descriptors

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### What is a rubric?

- Rubrics generally contain three components:
  - dimensions (performance criteria),
  - scale (levels of performance),
  - descriptors
- Can be used for both formative and summative purposes
- A way to define expectations, especially in dealing with processes or abstract concepts
- Provides a common "language" to help faculty and students talk about expected learning
- Increases reliability of the assessment when using multiple raters (faculty)

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Developing a rubric

- A rubric is a set of categories
  - Defines and describes the components of criterion to be assessed
- Each category contains levels of performance
  - Includes a descriptive category assigned to each level and a clear description of what performance need to be met to attain the level of achievement

Purpose of Rubric

- Purpose drives decisions about rubrics
  - What kind of feedback do you want?
    - Individual student/program
    - General/specific
  - How will data be used?
    - Formative/summative
    - Developmental over time/single point in time
  - For whom?
    - Student
    - Faculty member
    - Program
Purpose of Rubric
(How are you going to use it?)

- **Overall** examination of student performance
- **Specific** information to/about student competence
  - Provides diagnosis for purpose of improvement and feedback
Developing rubrics

- Be clear about how the rubric is to be used
  - Program assessment
  - Individual student assessment
- Analytic/Holistic
  - For process improvement, analytic rubric provides information that can be used to focus instruction in areas of weakness
- Use student work as a guide in developing rubric
- Start with extremes and work toward middle
- Pilot test
- Rubric development is a process

How to Apply Rubric

- Start by doing an inventory of courses where students get an opportunity to learn, practice, demonstrate and practice the desired performance criterion
  - Curriculum map
Please rate each member of the team on the following scale:

<table>
<thead>
<tr>
<th>1</th>
<th>Unsatisfactory</th>
<th>2</th>
<th>Developing</th>
<th>3</th>
<th>Satisfactory</th>
<th>4</th>
<th>Exemplary</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Produces research information for team</td>
<td></td>
<td>Demonstrates understanding of team roles when assigned</td>
<td></td>
<td>Shares in the work of the team</td>
<td></td>
<td>Demonstrates good listening skills</td>
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</table>

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Types of Rubrics

- Holistic:
  - Raters make judgments by forming an overall impression of a performance and matching it to the best fit from among the descriptions on the scale
  - Each category on the scale describes performance on several performance criteria

Work Effectively in Teams

<table>
<thead>
<tr>
<th>Unsatisfactory</th>
<th>Developing</th>
<th>Satisfactory</th>
<th>Exemplary</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

- Does not collect any information that relates to the topic.
- Does not perform any duties of assigned team role.
- Always relies on others to do the work.
- Is always talking—never allows anyone else to speak.

- Collects very little information—some relates to the topic.
- Performs very little of assigned duties.
- Rarely does the assigned work—often needs reminding.
- Usually doing most of the talking—rarely allows others to speak.

- Collects some basic information—most relates to the topic.
- Performs nearly all assigned duties.
- Usually does the assigned work—rarely needs reminding.
- Listens, but sometimes talks too much.

- Collects a great deal of information—all relates to the topic.
- Performs all duties of assigned team role.
- Always does the assigned work without having to be reminded.
- Listens and encourages others to participate.

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Example of Results

Work effectively in teams

At a level expected for a student who will graduate?

Holistic Rubric

- **Advantages:**
  - They are often written generically and can be used with many tasks.
  - They save time by minimizing the number of decisions raters must make.
  - Trained raters tend to apply them consistently, resulting in more reliable measurement.

- **Disadvantages:**
  - They do not provide specific feedback about the strengths and weaknesses of student performance.
  - Performances may meet criteria in two or more categories, making it difficult to select the one best description. (If this occurs frequently, the rubric may be poorly written.)
  - Criteria cannot be differentially weighted.
Analytic Rubric

- Analytic scales tend to focus on important dimensions of student performance related to performance criteria.
- Dimensions are presented in separate categories and rated individually.
- Points with associated descriptors are assigned for performance on each of the dimensions.

Analytic Rubric

- **Advantages:**
  - They provide useful feedback about areas of strength and weakness in student performance.
  - Their dimensions can be weighted to reflect relative importance.
  - They can demonstrate progress over time in some or all dimensions when the same rubric categories are used repeatedly

- **Disadvantages:**
  - They take more time to create and use.
  - There are more possibilities for raters to disagree. It is more difficult to achieve intra- and inter-rater reliability on all of the dimensions in an analytic rubric than on a single score yielded by a holistic rubric.

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## Work Effectively in Teams

<table>
<thead>
<tr>
<th></th>
<th>Unsatisfactory 1</th>
<th>Developing 2</th>
<th>Satisfactory 3</th>
<th>Exemplary 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research &amp; Gather Information</td>
<td>Does not collect any information that relates to the topic.</td>
<td>Collects very little information—some relates to the topic.</td>
<td>Collects some basic information—most relates to the topic.</td>
<td>Collects a great deal of information—all relates to the topic.</td>
</tr>
<tr>
<td>Fulfill Team Role’s Duties</td>
<td>Does not perform any duties of assigned team role.</td>
<td>Performs very little duties.</td>
<td>Performs nearly all duties.</td>
<td>Performs all duties of assigned team role.</td>
</tr>
<tr>
<td>Share in work of team</td>
<td>Always relies on others to do the work.</td>
<td>Rarely does the assigned work—often needs reminding.</td>
<td>Usually does the assigned work—rarely needs reminding.</td>
<td>Always does the assigned work without having to be reminded.</td>
</tr>
<tr>
<td>Listen to Other Teammates</td>
<td>Is always talking—never allows anyone else to speak.</td>
<td>Usually doing most of the talking—rarely allows others to speak.</td>
<td>Listens, but sometimes talks too much.</td>
<td>Listens and speaks a fair amount.</td>
</tr>
</tbody>
</table>

### Teaming Skills

**Percent meeting criterion**

<table>
<thead>
<tr>
<th>Performance Criterion #</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research &amp; gather information</td>
<td>54%</td>
<td>38%</td>
<td>25%</td>
<td>81%</td>
</tr>
<tr>
<td>Fulfill team role’s duties</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shares in work of the team</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Listens to teammates</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Making choices

➤ Use a holistic rubric when:
  • Snapshot of achievement is sufficient
  • A single dimension is adequate to understand student performance

➤ Use an analytic rubric when:
  • There is a need to see relative strengths and weaknesses.
  • Detailed feedback is needed to drive improvements
  • Need to assess complicated skills or performance.
  • You want students to self-assess their understanding or performance.
Generic or Task-Specific?

- Generic
  - Rubric that can be used across similar performances (used across all communication tasks or problem solving tasks)
- Task-specific
  - Rubric which is designed for a single task
  - Cannot be generalized across a wide variety of student work

How many points on the scale?

- Consider both the nature of the performance and purpose of scoring
- Recommend 3 to 5 points to describe student achievement at a single point in time.
- If focused on developmental curriculum (growth over time) more points are needed (i.e., 6-11??)
- More points on a scale, the more difficult it is to get inter-rater reliability.
# Teamwork Rubric

<table>
<thead>
<tr>
<th>Contribute</th>
<th>Beginning</th>
<th>Developing 2</th>
<th>Accomplished 3</th>
<th>Exemplary 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Research &amp; Gather Information</strong></td>
<td>Does not collect any information that relates to the topic.</td>
<td>Collects very little information—some relates to the topic.</td>
<td>Collects some basic information—most relates to the topic.</td>
<td>Collects a great deal of information—all relates to the topic.</td>
</tr>
<tr>
<td><strong>Share Information</strong></td>
<td>Does not relay any information to teammates.</td>
<td>Relays very little information—some relates to the topic.</td>
<td>Relays some basic information—most relates to the topic.</td>
<td>Relays a great deal of information—all relates to the topic.</td>
</tr>
<tr>
<td><strong>Be Punctual</strong></td>
<td>Does not hand in any assignments late.</td>
<td>Hands in most assignments late.</td>
<td>Hands in most assignments on time.</td>
<td>Hands in all assignments on time.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Take Responsibility</th>
<th>Beginning</th>
<th>Developing 2</th>
<th>Accomplished 3</th>
<th>Exemplary 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fulfill Team Role's Duties</strong></td>
<td>Does not perform any duties of assigned team role.</td>
<td>Performs very little duties.</td>
<td>Performs nearly all duties.</td>
<td>Performs all duties of assigned team role.</td>
</tr>
<tr>
<td><strong>Participate in Science Conference</strong></td>
<td>Does not speak during science conference.</td>
<td>Either gives too little information or information which is irrelevant to topic.</td>
<td>Offers some information—most is relevant.</td>
<td>Offers a fair amount of important information—all is relevant.</td>
</tr>
<tr>
<td><strong>Value Others' Viewpoints</strong></td>
<td>Always relies on others to do the work.</td>
<td>Rarely does the assigned work—rarely needs reminding.</td>
<td>Usually does the assigned work—rarely needs reminding.</td>
<td>Always does the assigned work without having to be reminded.</td>
</tr>
</tbody>
</table>

| Listen to Other Teammates        | Usually does most of the talking—rarely allows others to speak. | Occasionally allows others to speak. | Listens, but sometimes talks too much. | Listens and speaks a fair amount. |
| Make Fair Decisions              | Usually wants to have others' way. | Occasionally considers all viewpoints. | Usually considers all viewpoints. | Always helps team to reach a decision. |

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**Teamwork Rubric**

4 - **Thorough Understanding**

- Consistently and actively works towards group goals
- Is sensitive to the feelings and learning needs of all group members
- Willingly accepts and fulfills individual role within the group
- Consistently and actively contributes knowledge, opinions, and skills
- Values the knowledge, opinion, and skills of all group members and encourages their contribution

3 - **Good Understanding**

- Works toward group goals without prompting
- Accepts and fulfills individual role within the group
- Contributes knowledge, opinions, and skills without prompting
- Shows sensitivity to the feelings of others
- Willingly participates in needed changes

2 - **Satisfactory Understanding**

- Works toward group goals with occasional prompting
- Contributes to the group with occasional prompting
- Shows sensitivity to the feelings of others
- Participates in needed changes, with occasional prompting

1 - **Needs Improvement**

- Works toward group goals only when prompted
- Contributes to the group only when prompted
- Needs occasional reminders to be sensitive to the feelings of others
- Participates in needed changes when prompted and encouraged

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### Writing Skills Rubric

<table>
<thead>
<tr>
<th>Performance</th>
<th>4 Exceeds standard</th>
<th>3 Meets standard</th>
<th>2 Progressing to standard</th>
<th>1 Below standard</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Content</strong></td>
<td>Maintain exceptional focus on the topic</td>
<td>Maintain consistent focus on the topic</td>
<td>Provides inconsistent focus on the topic</td>
<td>Demonstrates little or no focus</td>
</tr>
<tr>
<td><strong>Supporting Details</strong></td>
<td>Provides ample supporting details</td>
<td>Provides adequate supporting details</td>
<td>Includes some details but may include extraneous or loosely related material</td>
<td>Includes inconsistent or few details which may interfere with the meaning of the text</td>
</tr>
<tr>
<td><strong>Organization</strong></td>
<td>Organizational pattern is logical &amp; conveys completeness &amp; wholeness</td>
<td>Organizational pattern is logical &amp; conveys completeness &amp; wholeness through few lapses</td>
<td>Achieves little completeness &amp; wholeness through organization attempted</td>
<td>Little evidence of organization or any sense of wholeness &amp; completeness</td>
</tr>
<tr>
<td><strong>Transitions</strong></td>
<td>Provides transitions that eloquently serve to connect ideas</td>
<td>Provides transitions which serve to connect ideas</td>
<td>Provides transitions which are weak or inconsistent</td>
<td>Uses poor transitions or fails to provide transitions</td>
</tr>
<tr>
<td><strong>Voice</strong></td>
<td>Allows the reader to sense the person behind the words</td>
<td>Sense of the person behind the words is evident</td>
<td>Sense of the person behind the words is not evident</td>
<td>Little or no sense of the person behind the words is evident</td>
</tr>
<tr>
<td><strong>Word Choice</strong></td>
<td>Uses effective language; makes engaging, appropriate word choices for audience &amp; purpose</td>
<td>Uses effective language &amp; appropriate word choices for intended audience &amp; purpose</td>
<td>Limited or predictable vocabulary, perhaps not appropriate for intended audience &amp; purpose</td>
<td>Has a limited or inappropriate vocabulary for the intended audience &amp; purpose</td>
</tr>
<tr>
<td><strong>Sentence Fluency</strong></td>
<td>Sentences/phrases are varied in length &amp; structure</td>
<td>Sentences/phrases are varied in length &amp; structure</td>
<td>Shows limited variety in sentence length &amp; structure</td>
<td>Has little or no variety in sentence length &amp; structure</td>
</tr>
<tr>
<td><strong>Conventions</strong></td>
<td>Consistently follows the rules of Standard English for conventions</td>
<td>Generally follows the rules of Standard English for conventions</td>
<td>Consistently does not follow the rules of Standard English for conventions</td>
<td>Does not follow the rules of Standard English for conventions</td>
</tr>
</tbody>
</table>

http://www.kent.edu/COM/Write5SkillsRubric.doc

---

**Summary**

- Need to be clear about how rubric is going to be used
- Rubrics are not required for outcomes
- Rubrics guide faculty in the assessment process and provide understanding of areas of strength and weakness in student performance related to specific performance criteria
- Importance of pilot testing the rubric
  - Increase inter-rater reliability and validity

---

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Linking results to Practice

- Development of Curriculum Map
- Linking curriculum content/pedagogy to knowledge, practice and demonstration of learning outcomes

Performance Criteria

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Explicit</th>
<th>Demonstrate Competence</th>
<th>Formal Feedback</th>
<th>Not Covered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recognition of ethical and professional responsibilities.</td>
<td>□ Yes</td>
<td>□ Yes</td>
<td>□ Yes</td>
<td>□</td>
</tr>
<tr>
<td>1. Demonstrate knowledge of professional codes of ethics.</td>
<td>View note or make a comment (optional)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Evaluate ethical dimensions of professional engineering, mathematical, and scientific practices.</td>
<td>View note or make a comment (optional)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>An ability to work effectively in teams</td>
<td>□ Yes</td>
<td>□ Yes</td>
<td>□ Yes</td>
<td>□</td>
</tr>
<tr>
<td>1. Share responsibilities and duties, and take on different roles when applicable</td>
<td>View note or make a comment (optional)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Analyze ideas objectively to discern feasible solutions by holding consensus</td>
<td>View note or make a comment (optional)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Develop a strategy for action.</td>
<td>View note or make a comment (optional)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>An ability to communicate effectively in oral, written, graphical, and visual forms</td>
<td>□ Yes</td>
<td>□ Yes</td>
<td>□ Yes</td>
<td>□</td>
</tr>
<tr>
<td>1. Identify the reader/user, assess prior knowledge and information needs, and organize relevant information in order to meet those needs.</td>
<td>View note or make a comment (optional)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Provide context that is basically correct, supported with evidence, explained with sufficient detail, and properly documented.</td>
<td>View note or make a comment (optional)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Test readers/users with a question that assesses understanding of core ideas contained in group or team discussion.</td>
<td>View note or make a comment (optional)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Submit work with a minimum of errors in spelling, punctuation, grammar, and usage.</td>
<td>View note or make a comment (optional)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

G. Rogers - ABET, Inc.
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### Curriculum Map for Communication Skills, All Criteria

<table>
<thead>
<tr>
<th>1st Year</th>
<th>2nd Year</th>
<th>3rd Year</th>
<th>4th Year</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FALL</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENG 111</td>
<td>Chem I</td>
<td>4</td>
<td>CH 414</td>
</tr>
<tr>
<td>EM 102</td>
<td>Life Skills</td>
<td>1</td>
<td>CH 415</td>
</tr>
<tr>
<td>TM 104</td>
<td>Graph Comm</td>
<td>2</td>
<td>CH 235</td>
</tr>
<tr>
<td>SH 112</td>
<td>Fresh Comm</td>
<td>4</td>
<td>CH 301</td>
</tr>
<tr>
<td>MA 111</td>
<td>Calc I</td>
<td>a</td>
<td>CH 220</td>
</tr>
<tr>
<td>CM 112</td>
<td>Chem III</td>
<td>4</td>
<td>CHE 202</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>WINTER</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HH 111</td>
<td>Physics I</td>
<td>4</td>
<td>CM 252</td>
</tr>
<tr>
<td>HH 111</td>
<td>Physics I</td>
<td>4</td>
<td>CM 340</td>
</tr>
<tr>
<td>HH 112</td>
<td>Elective</td>
<td>4</td>
<td>MA 222</td>
</tr>
<tr>
<td>HH 112</td>
<td>Elective</td>
<td>4</td>
<td>MA 305</td>
</tr>
<tr>
<td>MA 123</td>
<td>Calc II</td>
<td>5</td>
<td>MA 101</td>
</tr>
<tr>
<td>MA 123</td>
<td>Calc II</td>
<td>5</td>
<td>MA 101</td>
</tr>
<tr>
<td>HH 113</td>
<td>Elective</td>
<td>4</td>
<td>HH 113</td>
</tr>
<tr>
<td><strong>SPRING</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CM 115</td>
<td>Chem III</td>
<td>4</td>
<td>EE 256</td>
</tr>
<tr>
<td>CS 101</td>
<td>Program</td>
<td>2</td>
<td>CHE 402</td>
</tr>
<tr>
<td>EM 103</td>
<td>Int Design</td>
<td>4</td>
<td>HH 113</td>
</tr>
<tr>
<td>MA 113</td>
<td>Calc III</td>
<td>5</td>
<td>CH 303</td>
</tr>
<tr>
<td>HH 113</td>
<td>Physics II</td>
<td>4</td>
<td>HH 113</td>
</tr>
</tbody>
</table>

### Business Administration Map

<table>
<thead>
<tr>
<th>Macro-Economics</th>
<th>Micro-Economics</th>
<th>Service Industry App</th>
<th>Bus Law</th>
<th>Writing for Bus</th>
<th>Pre-Cal</th>
<th>Bus Statistics</th>
<th>Internship</th>
<th>Internship</th>
<th>Internship</th>
<th>Internship</th>
<th>Elective (free)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Econ 2</td>
<td>Econ 208</td>
<td>Econ 209</td>
<td>Bus 201</td>
<td>Bus 202</td>
<td>Bus 115</td>
<td>Bus 201</td>
<td>Bus 202</td>
<td>Bus 201</td>
<td>Bus 201</td>
<td>Bus 201</td>
<td>Bus 201</td>
</tr>
</tbody>
</table>

**Valence Competencies:**

- Identify a subject and formulate a basis statement.
- Organize ideas to support a position.
- Write in a unified and coherent manner appropriate to the subject matter.
- Use appropriate sentence structure and vocabulary.
- Document references and citations according to an accepted style manual.

**Critical Thinking Competencies:**

- Identify business problems and apply creative solutions.
- Identify and apply leadership techniques.
- Translate concepts into current business environments.
- Analyze complex problems by identifying and evaluating the components of the problem.

**Quantitative Reasoning Competencies:**

- Apply quantitative methods to solving real-world problems.
- Perform necessary arithmetic computations to solve quantitative problems.
- Evaluate information presented in tabular, numerical, and graphical form.

---

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Assessment Methods

- Written surveys and questionnaires
- Exit and other interviews
- Standardized exams
- Locally developed exams
- Archival records
- Focus groups
- Portfolios
- Simulations
- Performance Appraisal
- External examiner
- Oral exams
- Behavioral observations

Direct Measures

Direct measures provide for the direct examination or observation of student knowledge or skills against measurable performance criteria.
Indirect Measures

Indirect measures of student learning that ascertain the opinion or self-report of the extent or value of learning experiences

Direct
- Exit and other interviews
- Standardized exams
- Locally developed exams
- Portfolios
- Simulations
- Performance Appraisal
- External examiner
- Oral exams
- Behavioral observations

Indirect
- Written surveys and questionnaires
- Exit and other interviews
- Archival records
- Focus groups

Remember, whether or not a particular assessment method is direct or indirect depends on the nature of what is being measured and how the method is being used.

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Assignment

- After you have shared methods, choose TWO methods that are appropriate for the performance criteria chosen
- At least one DIRECT measure
- Record your findings
- Develop an implementation plan
- Include when, how often, context

Validity

- relevance - the assessment option measures the performance criteria as directly as possible
- accuracy - the option measures the performance criteria as precisely as possible
- utility - the option provides formative and summative results with clear implications for educational program evaluation and improvement

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“Bottom Lines”

- All assessment options have advantages and disadvantages
- “Ideal” method means those that are best fit between program needs, satisfactory validity, and affordability (time, effort, and money)
- Crucial to use multi-method/multi-source approach to maximize validity and reduce bias of any one approach

Assessment Method Truisms

- There will always be more than one way to measure any learning outcome
- No single method is good for measuring a wide variety of different student abilities
- There is generally an inverse relationship between the quality of measurement methods and their expediency
- It is important to pilot test to see if a method is appropriate for your program

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Developing Efficient Processes

Data Collection Process

- Why?
  - Know your question
- What?
  - Focus on few criteria for each outcome
- Who? Students (cohorts); faculty (some)
- When?
Sampling

- For program assessment, sampling is acceptable and even desirable for programs of sufficient size.
  - Sample is representative of all students

Data collection

Yr 1 | Yr 2 | Yr 3 | Yr 4 | Yr n
---|---|---|---|---
Define Outcomes/Map Curr | Data collection | Evaluation & design of improvements | Implement improvements & Data Collection

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<table>
<thead>
<tr>
<th>Learning Outcomes:</th>
<th>03-04</th>
<th>04-05</th>
<th>05-06</th>
<th>06-07</th>
<th>07-08</th>
<th>08-09</th>
</tr>
</thead>
<tbody>
<tr>
<td>A recognition of ethical and professional responsibilities</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>An understanding of how contemporary issues shape and are shaped by mathematics, science, &amp; engineering</td>
<td></td>
<td></td>
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<tr>
<td>An ability to recognize the role of professionals in the global society</td>
<td></td>
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<tr>
<td>An understanding of diverse cultural and humanistic traditions</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>An ability to work effectively in teams</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>An ability to communicate effectively in oral, written, graphical, and visual forms</td>
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<td></td>
</tr>
</tbody>
</table>

*Means you are assessing that outcome that year.*

---

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### Closing the Loop

**FALL**

- **Nov:**
  - Conduct follow-up assessments.
  - Report progress to the Faculty Committee.

**Winter**

- **Jan:**
  - Submit follow-up assessment reports to the Faculty Committee.
  - Review and evaluate student feedback.
  - Prepare action plans for improvement.

- **Feb:**
  - Submit action plans.
  - Submit action plans for review.

- **Mar:**
  - Submit action plans for review.
  - Submit action plans for final validation.

### Student Learning Outcomes at the PROGRAM level

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Performance Criteria</th>
<th>Strategies</th>
<th>Assessment Method(s)</th>
<th>Context for Assessment</th>
<th>Time of data collection</th>
<th>Assessment Coordinator</th>
<th>Evaluation of Results</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Results _____(date):

Actions _____(date):

Second-Cycle Results _____(date):

---

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<table>
<thead>
<tr>
<th>Performance Criteria</th>
<th>Strategies</th>
<th>Assessment Method(s)</th>
<th>Source of Assessment</th>
<th>Time of data collection</th>
<th>Assessment Coordinator</th>
<th>Evaluation of Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Produces research information for team</td>
<td>ME 224, ME 228, ME 411, ME 412, ME 305, ME 333, ME 333, ME 412</td>
<td>Peer Evaluations, Faculty Evaluations</td>
<td>ME412</td>
<td>Spring-odd years (2003, 2005)</td>
<td>2003 – Brackin 2005 - Richards</td>
<td>Department Curriculum Committee</td>
</tr>
<tr>
<td>2. Demonstrates understanding of team roles when assigned</td>
<td>ME 113, ME 213, ME 412, ME 333, ME 412</td>
<td>Peer Evaluations, Faculty Evaluations</td>
<td>ME412</td>
<td>Spring-odd years (2003, 2005)</td>
<td>2003 – Brackin 2005 - Richards</td>
<td>Department Curriculum Committee</td>
</tr>
</tbody>
</table>

Results: 2003: A sample of 55 students (52% of 2003 cohort) were assessed. This represents 2 of 4 sections of ME 412 (which is the second semester of a two-semester team experience.) The percent of the sample that demonstrated each criterion were as follows: Criterion 1 - 72%; Criterion 2 - 85%; Criterion 3 - 83%; Criterion 4 - 89%.

Assessments 2004-05: Based on the analysis of the results, the department asked faculty to provide learning evaluation rubrics to students with the course assignments where the students were provided opportunities to demonstrate their team skills as defined by the criteria. A sub-committee of the department Curriculum Committee met to review the results of the assessment. It was decided not to make any changes at this time. Faculty decided that they would review their assignments to be sure that students were given adequate opportunities to demonstrate the performance identified for learning. Faculty also agreed to make students performance on the criteria part of their grade for the activity. The Teaching/Learning Center will also provide a seminar for faculty on how to integrate effective learning into the classroom.

Second-Cycle Results: A sample of 55 students (51% of cohort) were assessed. This represents 2 of 4 sections of ME 412 (which is the second semester of a two-semester team experience.) Based on changes made, the following improvements were seen: Criterion 1 - 12% (84%); Criterion 2 - 7% (72%); Criterion 3 - 13% (75%); Criterion 4 - 2% (81%).

Actions 2005-07: Although progress was made on all criteria, the Curriculum Committee recommended that the Department take another look at all the performance criteria related to learning. The Teaching/Learning Center was asked to provide the Department some feedback on the criteria and also provide other examples of learning performance criteria. This will be one of the issues that will be discussed at the Department retreat for possible revisions for the 2007 academic year.

Preparring an Effective Report of your Assessment Process

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Back to the Basics: Criteria – Objectives, Outcomes, Assessment

- Know your audience
- Keep it simple
- If you haven’t done it, you’re not going to fool them

For Guidance Only

The institution may employ any means it chooses to represent its assessment and evaluation processes to the visiting team.

Consequently, the references to specific processes in the following are for guidance only.

The information may be presented in any manner the institution chooses.

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Components of an Assessment Process

- Program Educational Objectives and Learning Outcomes
  - Similar but not the same
  - What are some of the differences?
    - Degree of specificity
    - Role of constituents
    - Types of measurements possible
    - Cycles of data collection
Reporting your results:

- What (are you assessing)
- Who
- When
- What (are your results)
- What (did you do with the results)
- What (difference did it make)
Reporting Results:
Data or Information?

Ability to Work Effectively in Teams
% of students assessed meeting criteria

Teaming

Reporting Results:
Data or Information?

Ability to Work Effectively in Teams
% of students assessed meeting criterion

Research and gather information : 78%
Fulfill team role duties : 42%
Shares work equally : 62%
Listens to teammates : 91%

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Samples of 56 and 58 students (52% of 2003 and 51% of 2005 cohort) were assessed. This represents 2 of 4 sections of ME412 (which is the second semester of a two-semester team experience.)

Ability to Work Effectively in Teams

- 2001
- 2003
- 2005

Table

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Performance Criteria</th>
<th>2001</th>
<th>2003</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaming</td>
<td>Research and Gather Information</td>
<td>72%</td>
<td>84%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fulfill team role</td>
<td>50%</td>
<td>65%</td>
<td>72%</td>
</tr>
<tr>
<td></td>
<td>Share work</td>
<td>58%</td>
<td>62%</td>
<td>75%</td>
</tr>
<tr>
<td></td>
<td>Listens</td>
<td>70%</td>
<td>89%</td>
<td>91%</td>
</tr>
<tr>
<td>Ethics</td>
<td>From the code of ethics</td>
<td>45%</td>
<td>64%</td>
<td>77%</td>
</tr>
<tr>
<td></td>
<td>Analyze ethical issues</td>
<td>32%</td>
<td>56%</td>
<td>74%</td>
</tr>
<tr>
<td></td>
<td>Conduct independent research</td>
<td>64%</td>
<td>68%</td>
<td>65%</td>
</tr>
<tr>
<td>Life Long Learning</td>
<td>Identify opportunities for continued education in the field</td>
<td>57%</td>
<td>67%</td>
<td>86%</td>
</tr>
<tr>
<td></td>
<td>Indicates interest in continuing education</td>
<td>65%</td>
<td>76%</td>
<td>87%</td>
</tr>
</tbody>
</table>

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# Learning Outcome: Students can work effectively in teams

<table>
<thead>
<tr>
<th>Performance Criteria</th>
<th>Strategies</th>
<th>Assessment Method(s)</th>
<th>Source of Assessment</th>
<th>Time of data collection</th>
<th>Assessment Coordinator</th>
<th>Evaluation of Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Research and gather information</td>
<td>ME 233, ME 238, ME 211, EM 213, ME 233, ME 333, ME 412</td>
<td>Peer Evaluations, Faculty Evaluations</td>
<td>ME 412</td>
<td>Spring-odd years (2003, 2005)</td>
<td>2003 - B. Richards</td>
<td>Department Curriculum Committee</td>
</tr>
<tr>
<td>2. Fulfill team roles</td>
<td>ME 111, EM 213, ME 233, ME 333, ME 412</td>
<td>Peer Evaluations, Faculty Evaluations</td>
<td>ME 412</td>
<td>Spring-odd years (2003, 2005)</td>
<td>2003 - B. Richards</td>
<td>Department Curriculum Committee</td>
</tr>
<tr>
<td>3. Shares work equally</td>
<td>ME 111, EM 213, ME 213, ME 233, ME 333, ME 412</td>
<td>Peer Evaluations, Faculty Evaluations</td>
<td>ME 412</td>
<td>Spring-odd years (2003, 2005)</td>
<td>2003 - B. Richards</td>
<td>Department Curriculum Committee</td>
</tr>
<tr>
<td>4. Listens to teammates</td>
<td>ME 111, EM 213, ME 213, ME 233, ME 333, ME 412</td>
<td>Faculty Evaluations</td>
<td>ME 412</td>
<td>Spring-odd years (2003, 2005)</td>
<td>2003 - B. Richards</td>
<td>Department Curriculum Committee</td>
</tr>
</tbody>
</table>

Results 2003: A sample of 59 students (59% of cohort) were assessed. This represents 2 of 4 sections of ME 412 (which is the second semester of a two-semester team experience). The percent of the sample that demonstrated each criterion were as follows: Criterion 1 - 92%, Criterion 2 - 66%, Criterion 3 - 65%, Criterion 4 - 89%.

Actions: In response to the analysis of the results, the department asked faculty to provide the learning evaluation rubrics to students with the assignments where the students were provided opportunities to demonstrate their learning skills as defined by the criteria. A sub-committee of the department Curriculum Committee met to review the performance criteria. It was decided not to make any changes at this time. Faculty decided that they would review their assignments to be sure that students were given adequate opportunities to demonstrate the performance identified for learning. Faculty also agreed to make students performance on the criteria a part of their grade for the activity. The Teaching/Learning Center will also provide a seminar for faculty on how to integrate effective learning into the classroom.

Second-Cycle Results: A sample of 59 students (59% of cohort) were assessed. This represents 2 of 4 sections of ME 412 (which is the second semester of a two-semester team experience). Based on changes made, the following improvements were seen: Criterion 1 - +12% (84%), Criterion 2 - +7% (72%), Criterion 3 - +13% (75%), Criterion 4 - +12% (81%).

Actions 2006-07: Although progress was made on all criteria, the Curriculum Committee recommended that the Department take another look at all the performance criteria related to learning. The Teaching/Learning Center was asked to provide the Department some feedback on the criteria and also provide other examples of learning performance criteria. This will be one of the issues that will be discussed at the Department retreat for possible revisions for the 2007 academic year.

---

# Common Mistakes

- Too many data, not enough information
  - Reporting numbers or percentages without putting them into context
    - How many students/graduates in cohort
    - How many students/graduates provided data
- Not describing how the data are evaluated
- Using very complex charts describing your assessment processes

---

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Common Mistakes

- Discussing all outcomes/objectives at once instead of one at a time.
- Using the terms "objectives" and "outcomes" interchangeably.
- Referencing the outcomes/objectives by numbers or letters that refer back to a chart. Don't require the reader to go back in the self-study for the reference.

Summary

- Keep the report focused.
- Have someone read your report that knows nothing about your program. If they don't understand it, chances are neither will the visiting team.
- There is elegance in simplicity.
Checklist

☑ Assessment question is known and explicit
☑ Outcomes are defined and number of performance criteria are manageable
☑ Data are efficiently and systematically collected
☑ Assessment methods are appropriate to program context
☑ Results are evaluated
  ☑ Evaluation is more than looking at the results of learning outcomes
☑ Action is appropriate

Things I wish I had known:

☑ Capitalize on what you are already doing
☑ One size does not fit all
☑ You don't have to measure everything all the time
☑ More data are not always better
☑ Pick your battles
☑ Take advantage of local resources
☑ Don't wait for perfection
☑ Go for the early win
☑ Decouple from faculty evaluation

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Best Assessment Processes Symposium XI

Indianapolis, Indiana • April 3-4, 2009

The Best Assessment Processes Symposium provides interactive and lecture-based opportunities for applied science, computing, engineering, and technology educators to learn about assessment methods and how they can be used to validate and improve student learning outcomes. 2009 marks the 11th anniversary of the symposium.

Call for Proposals

Special consideration will be given to proposals on the following topics:

- Assessing program objectives
- Documenting continuous improvement
- Writing measurable program outcomes

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grogers@abet.org
### Self-Assessment: Quality Assurance of Program-Level Assessment of Student Learning

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0-not in place; 1-beginning stage of development; 2-beginning stage of implementation; 3-in place and implemented; 4-implemented and evaluated for effectiveness; 5-implemented, evaluated and at least one cycle of improvement

<table>
<thead>
<tr>
<th>Stakeholder Involvement</th>
<th>Program Educational Objectives (Graduates performance after completing program)</th>
<th>Program Outcomes (Desired knowledge, skills, attitudes, behaviors, by the time of completing program)</th>
<th>Program Outcomes aligned with educational practices</th>
<th>Assessment Processes</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stakeholders are identified</td>
<td>Objectives are defined</td>
<td>Outcomes are identified</td>
<td>Desired outcomes and are mapped to curricular practices and/or strategies (e.g., courses/teaching methodology)</td>
<td>Assessment is on-going and systematic at the program level</td>
<td>Assessment data are systematically reviewed</td>
</tr>
<tr>
<td>Primary stakeholders are involved in identifying/affirming program educational objectives</td>
<td>Objectives are publicly documented</td>
<td>Number of outcomes are manageable</td>
<td>Practices/strategies are systematically evaluated using outcomes assessment data</td>
<td>Multiple methods are used to measure each outcome</td>
<td>Evaluation of results are done by those who can effect change</td>
</tr>
<tr>
<td>Primary stakeholders are involved in periodic evaluation of educational objectives</td>
<td>Number of objectives are manageable</td>
<td>Outcomes are publicly documented</td>
<td>Where necessary, educational practices are modified based on evaluation of assessment data</td>
<td>Both direct and indirect measures of student learning are used to measure outcomes</td>
<td>Evaluation of assessment data is linked to curricular practices/strategies</td>
</tr>
<tr>
<td>Sustained partnerships with stakeholders are developed</td>
<td>Objectives are aligned with department/program mission statement</td>
<td>Outcomes are linked to educational objectives</td>
<td>Assessment processes are reviewed for effectiveness and efficiency</td>
<td>Evaluation leads to decision making/action</td>
<td></td>
</tr>
<tr>
<td>Objectives are periodically assessed to determine achievement</td>
<td>Outcomes are defined by a manageable number of measurable performance indicators</td>
<td></td>
<td>When needed, assessment methods are modified based on evaluation processes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Objectives are periodically evaluated for currency</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

1 This tool is intended for self-assessment only to assist in understanding areas for improvement in the assessment process development. Assessment Planning Flowchart © 2004 Revised January 2008.
9 Principles of Good Practice for Assessing Student Learning

1. **The assessment of student learning begins with educational values.** Assessment is not an end in itself but a vehicle for educational improvement. Its effective practice, then, begins with and enacts a vision of the kinds of learning we most value for students and strive to help them achieve. Educational values should drive not only what we choose to assess but also how we do so. Where questions about education mission and values are skipped over, assessment threatens to be an exercise in measuring what's easy, rather than a process of improving what we really care about.

2. **Assessment is more effective when it reflects an understanding of learning as multidimensional, integrated, and revealed in performance over time.** Learning is a complex process. It entails not only what students know but values, attitudes, and habits they know; it involves not only knowledge and abilities but values, attitudes, and habits of mind that affect both academic success and performance beyond the classroom. Assessment should reflect these understandings by employing a diverse array of methods, including those that call for actual performance, using them over time so as to reveal change, growth, and increasing degrees of integration. Such an approach aims for a more complete and accurate picture of learning, and therefore firmer bases for improving out students' educational experience.

3. **Assessment works best when the programs it seeks to improve have clear, explicitly stated purposes.** Assessment is a goal-oriented process. It entails comparing educational performance with educational purposes and expectations — those derived from the institution's mission from faculty intentions in program and course design, and from knowledge of students' own goals. Where program purposes lack specificity or agreement, assessment as a process pushes a campus toward clarity about where to aim and what standards to apply; assessment also prompts attention to where and how program goals will be taught and learned. Clear, shared, implementable goals are the cornerstone for assessment that is focused and useful.

4. **Assessment requires attention to outcomes but also and equally to the experiences that lead to those outcomes.** Information about outcomes is of high importance; where students "end up" matters greatly. But to improve outcomes, we need to know about student experience along the way — about the curricula, teaching, and kind of student effort that lead to particular outcomes. Assessment can help us understand which students learn best under what conditions; with such knowledge comes the capacity to improve the whole of their learning.

5. **Assessment works best when it is ongoing not episodic.** Assessment is a process whose power is cumulative. Though isolated, "one shot" assessment can be better than none, improvement is best fostered when assessment entails a linked series if activities if activities undertaken over time. This may mean tracking the process of individual students, or of cohorts of students; it may mean collecting the same examples of student performance or using the same instrument semester after semester. The point is to monitor progress toward intended goals in a spirit of continuous improvement. Along the way, the assessment process itself should be evaluated and refined in light of emerging insights.

6. **Assessment fosters wider improvement when representatives from across the educational community are involved.** Student learning is a campus-wide responsibility, and assessment is a way of enacting that responsibility. Thus, while assessment efforts may start small, the aim over time is to involve people from
across the educational community. Faculty plays an especially important role, but assessment’s questions can’t be fully addressed without participation by student-affairs educators, librarians, administrators, and students. Assessment may also involve individuals from beyond campus (alumni/ae, trustees, employers) whose experience can enrich the sense of appropriate aims and standards for learning. Thus understood, assessment is not a task for small groups of experts but a collaborative activity; its aim is wider, better-informed attention to student learning by all parties with a stake in its improvement.

7. **Assessment makes a difference with it begins with issues of use and illuminates questions that people really care about.** Assessment recognizes the value of information in the process of improvement. But to be useful, information must be connected to issues or question that people really care about. This implies assessment approaches that produce evidence that relevant parties will find credible, suggestive, and applicable to decisions that need to be made. It means thinking in advance about how the information will be used, and by whom. The point of assessment is not to gather data and return “results”; it is a process that starts with the questions of decision-makers, that involves them in the gathering and interpreting of data, and that informs and helps guide continuous improvement.

8. **Assessment is most likely to lead to improvement when it is part of a larger set of conditions that promote change.** Assessment alone changes little. It’s greatest contribution comes on campuses where the quality of teaching and learning is visibly valued and worked at. On such campuses, the push to improve educational performance is a visible and primary goal of leadership; improving the quality of undergraduate education is central to the institution’s planning, budgeting, and personnel decisions. On such campuses, information about learning outcomes is seen as an integral part of decision making, and avidly sought.

9. **Through assessment, educators meet responsibilities to students and to the public.** There is a compelling public stake in education. As educators, we have a responsibility to the publics that support or depend on us to provide information about the ways in which our students meet goals and expectations. But that responsibility goes beyond reporting of such information; our deeper obligation — to ourselves, our students, and society — is to improve. Those to whom educators are accountable have a corresponding obligation to support such attempts at improvement.

**Authors**

Alexander W. Astin; Trudy W. Banta; K. Patricia Cross; Elaine El-Khawas; Peter T. Ewell; Pat Hutchings; Theodore J. Marchese; Kay M. McClenny; Maria Mentkowski; Margaret A. Miller; E. Thomas Moran; Barbara D. Wright. This document was developed under the auspices of the AAHE Assessment Forum (Barbara Cambridge is Director) with support from the Fund for the Improvement of Post-Secondary Education with additional support for publication and dissemination from the Exxon Education Foundation. Copies may be made without permission. AAHE site maintained by: Mary C. Schwarz mj Joyce@aahe.org

Modification Date: Thursday, July 25, 1996
Program Outcomes and Performance Criteria

Performance criteria are a means to focus on specific expectations of a program. They facilitate the curriculum delivery strategies, and assessment procedures. There is an important first step that must come before the development of performance criteria, and that is deciding on program outcomes. These are usually communicated to students in the program description, and are stated in terms that inform the students about the general purpose of the program and expectations of the faculty. The primary difference between program outcomes and performance criteria is that program outcomes are intended to provide general information and thus are not measurable, while performance criteria indicate concrete measurable expectations. Performance criteria define program outcomes in measurable terms.

Sample program outcomes:
- Students will have an understanding of the social influences that affected technology in culture.
- Students will work effectively as a member of a team.
- Students can apply the principles of math and science to a technical problem.
- Students will have an appreciation for the need to be lifelong learners.

Performance criteria indicate what concrete actions the student should be able to perform as a result of participation in the program and state minimum criterion for evaluation. Once program outcomes have been identified, the knowledge and skills necessary for the mastery of these outcomes should be listed. This will allow the desired behavior of the students to be described, and will eliminate ambiguity concerning demonstration of expected competencies. Performance criteria are made up of at least two main elements; action verb and content (referent). The expected behavior must be specified by name, using an observable action verb such as demonstrate, interpret, discriminate, or define.

Sample performance criteria:
- Students will know of a professional code of ethics. (knowledge)
- Students will be able to locate technical information independently. (comprehension)
- Students will solve research problems through the application of scientific methods. (application)
**COGNITIVE** learning is demonstrated by knowledge recall and the intellectual skills: comprehending information, organizing ideas, analyzing and synthesizing data, applying knowledge, choosing among alternatives in problem-solving, and evaluating ideas or actions.

<table>
<thead>
<tr>
<th>Level</th>
<th>Illustrative Verbs</th>
<th>Definition</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>arrange, define, describe, duplicate, identify, label, list, match, memorize, name, order, outline, recognize, relate, recall, repeat, reproduce, select, state</td>
<td>remembering previously learned information</td>
<td>memory of specific facts, terminology, rules, sequences, procedures, classifications, categories, criteria, methodology, principles, theories, and structure</td>
</tr>
<tr>
<td>Comprehension</td>
<td>classify, convert, defend, describe, discuss, distinguish, estimate, explain, express, extend, generalize, give examples, identify, indicate, infer, locate, paraphrase, predict, recognize, rewrite, report, restate, review, select, summarize, translate</td>
<td>grasping the meaning of information</td>
<td>stating problem in own words, translating a chemical formula, understanding a flow chart, translating words and phrases from a foreign language</td>
</tr>
<tr>
<td>Application</td>
<td>apply, change, choose, compute, demonstrate, discover, dramatize, employ, illustrate, interpret, manipulate, modify, operate, practice, predict, prepare, produce, relate, schedule, show, sketch, solve, use, write</td>
<td>applying knowledge to actual situations</td>
<td>taking principles learned in math and applying them to figuring the volume of a cylinder in an internal combustion engine</td>
</tr>
<tr>
<td>Analysis</td>
<td>analyze, appraise, break down, calculate, categorize, compare, contrast, criticize, diagram, differentiate, discriminate, distinguish, examine, experiment, identify, illustrate, infer, model, outline, point out, question, relate, select, separate, subdivide, test</td>
<td>breaking down objects or ideas into simpler parts and seeing how the parts relate and are organized</td>
<td>discussing how fluids and liquids differ, detecting logical fallacies in a student's explanation of Newton's 1st law of motion</td>
</tr>
<tr>
<td>Synthesis</td>
<td>arrange, assemble, categorize, collect, combine, comply, compose, construct, create, design, develop, devise, design, explain, formulate, generate, integrate, manage, modify, organize, plan, prepare, propose, rearrange, reconstruct, relate, reorganize, revise, rewrite, set up, summarize, synthesize, tell, write</td>
<td>rearranging component ideas into a new whole</td>
<td>writing a comprehensive report on a problem-solving exercise, planning a program or panel discussion, writing a comprehensive term paper</td>
</tr>
<tr>
<td>Evaluation</td>
<td>appraise, argue, assess, attach, choose, compare, conclude, contrast, defend, describe, discriminate, estimate, evaluate, explain, judge, justify, interpret, relate, predict, rate, select, summarize, support, value</td>
<td>making judgments based on internal evidence or external criteria</td>
<td>evaluating alternative solutions to a problem, detecting inconsistencies in the speech of a student government representative</td>
</tr>
</tbody>
</table>


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**AFFECTIVE** learning is demonstrated by behaviors indicating attitudes of awareness, interest, attention, concern, and responsibility, ability to listen and respond in interactions with others, and ability to demonstrate those attitudinal characteristics or values which are appropriate to the test situation and the field of study.

<table>
<thead>
<tr>
<th>Level</th>
<th>Illustrative Verbs</th>
<th>Definition</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receiving</td>
<td>asks, chooses, describes, follows, gives, holds, identifies, locates, names, points to, selects, sits erect, replies, uses</td>
<td>willingness to receive or attend</td>
<td>listening to discussions of controversial issues with an open mind, respecting the rights of others</td>
</tr>
<tr>
<td>Responding</td>
<td>answers, assists, complies, conforms, discusses, greets, helps, labels, performs, practices, presents, reads, recites, reports, selects, tells, writes</td>
<td>active participation indicating positive response or acceptance of an idea or policy</td>
<td>completing homework assignments, participating in team problem-solving activities</td>
</tr>
<tr>
<td>Valuing</td>
<td>completes, describes, differentiates, explains, follows, forms, initiates, invites, joins, justifies, proposes, reads, reports, selects, shares, studies, works</td>
<td>expressing a belief or attitude about the value or worth of something</td>
<td>accepting the idea that integrated curricula is a good way to learn, participating in a campus blood drive</td>
</tr>
<tr>
<td>Organization</td>
<td>adheres, alters, arranges, combines, compares, completes, defends, explains, generalizes, identifies, integrates, modifies, orders, organizes, prepares, relates, synthesizes</td>
<td>organizing various values into an internalized system</td>
<td>recognizing own abilities, limitations, and values and developing realistic aspirations</td>
</tr>
<tr>
<td>Characterization by a value or value complex</td>
<td>acts, discriminates, displays, influences, listens, modifies, performs, practices, proposes, qualifies, questions, revises, serves, solves, uses, verifies</td>
<td>the value system becomes a way of life</td>
<td>a person's lifestyle influences reactions to many different kinds of situations</td>
</tr>
</tbody>
</table>


Revised 11/07 G. Rogers
PSYCHOMOTOR learning is demonstrated by physical skills: coordination, dexterity, manipulation, grace, strength, speed; actions which demonstrate the fine motor skills such as use of precision instruments or tools, or actions which evidence gross motor skills such as the use of the body in dance or athletic performance.

<table>
<thead>
<tr>
<th>Level</th>
<th>Illustrative Verbs</th>
<th>Definition</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perception</td>
<td>chooses, describes, detects, differentiates, distinguishes, identifies, isolates, relates, selects, separates</td>
<td>using sense organs to obtain cues needed to guide motor activity</td>
<td>listening to the sounds made by guitar strings before tuning them, recognizing sounds that indicate malfunctioning equipment</td>
</tr>
<tr>
<td>Set</td>
<td>begins, displays, explains, moves, proceeds, reacts, responds, snows, starts, volunteers</td>
<td>being ready to perform a particular action: mental, physical or emotional</td>
<td>knowing how to use a computer mouse, having instrument ready to play and watching conductor at start of a musical performance, showing eagerness to assemble electronic components to complete a task</td>
</tr>
<tr>
<td>Guided response</td>
<td>assembles, builds, calibrates, constructs, dismantles, displays, dissects, fastens, fixes, grinds, heats, manipulates, measures, mends, mixes, organizes, sketches</td>
<td>performing under guidance of a model: imitation or trial and error</td>
<td>using a torque wrench just after observing an expert demonstrate a its use, experimenting with various ways to measure a given volume of a volatile chemical</td>
</tr>
<tr>
<td>Mechanism</td>
<td>(same list as for guided response)</td>
<td>being able to perform a task habitually with some degree of confidence and proficiency</td>
<td>demonstrating the ability to correctly execute a 60 degree banked turn in an aircraft 70 percent of the time</td>
</tr>
<tr>
<td>Complex or overt</td>
<td>(same list as for guided response)</td>
<td>performing a task with a high degree of proficiency and skill</td>
<td>dismantling and re-assembling various components of an automobile quickly with no errors</td>
</tr>
<tr>
<td>response</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adaptation</td>
<td>adapts, alters, changes, rearranges, reorganizes, revises, varies</td>
<td>using previously learned skills to perform new but related tasks</td>
<td>using skills developed learning how to operate an electric typewriter to operate a word processor</td>
</tr>
<tr>
<td>Origination</td>
<td>arranges, combines, composes, constructs, creates, designs, originates</td>
<td>creating new performances after having developed skills</td>
<td>designing a more efficient way to perform an assembly line task</td>
</tr>
</tbody>
</table>


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<table>
<thead>
<tr>
<th>Performance</th>
<th>Scale (Numeric w/descriptor)</th>
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<th>Scale (Numeric w/descriptor)</th>
<th>Scale (Numeric w/descriptor)</th>
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<tbody>
<tr>
<td>Performance</td>
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<td>Performance</td>
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<tr>
<td>Performance</td>
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</tbody>
</table>
# Collaboration Rubric

<table>
<thead>
<tr>
<th></th>
<th>Beginning 1</th>
<th>Developing 2</th>
<th>Accomplished 3</th>
<th>Exemplary 4</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Contribute</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research &amp; Gather Information</td>
<td>Does not collect any information that relates to the topic.</td>
<td>Collects very little information--some relates to the topic.</td>
<td>Collects some basic information--most relates to the topic.</td>
<td>Collects a great deal of information--all relates to the topic.</td>
<td></td>
</tr>
<tr>
<td>Share Information</td>
<td>Does not relay any information to teammates.</td>
<td>Relays very little information--some relates to the topic.</td>
<td>Relays some basic information--most relates to the topic.</td>
<td>Relays a great deal of information--all relates to the topic.</td>
<td></td>
</tr>
<tr>
<td>Be Punctual</td>
<td>Does not hand in any assignments.</td>
<td>Hands in most assignments late.</td>
<td>Hands in most assignments on time.</td>
<td>Hands in all assignments on time.</td>
<td></td>
</tr>
<tr>
<td><strong>Take Responsibility</strong></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Fulfill Team Role's Duties</td>
<td>Does not perform any duties of assigned team role.</td>
<td>Performs very little duties.</td>
<td>Performs nearly all duties.</td>
<td>Performs all duties of assigned team role.</td>
<td></td>
</tr>
<tr>
<td>Share Equally</td>
<td>Always relays on others to do the work.</td>
<td>Rarely does the assigned work--often needs reminding.</td>
<td>Usually does the assigned work--rarely needs reminding.</td>
<td>Always does the assigned work without having to be reminded.</td>
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</tr>
<tr>
<td><strong>Value Others' Viewpoints</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Listen to Other Teammates</td>
<td>Is always talking--never allows anyone else to speak.</td>
<td>Usually doing most of the talking--rarely allows others to speak.</td>
<td>Listens, but sometimes talks too much.</td>
<td>Listens and speaks a fair amount.</td>
<td></td>
</tr>
<tr>
<td>Make Fair Decisions</td>
<td>Usually wants to have things their way.</td>
<td>Often sides with friends instead of considering all views.</td>
<td>Usually considers all views.</td>
<td>Always helps team to reach a fair decision.</td>
<td></td>
</tr>
</tbody>
</table>

http://edweb.sdsu.edu/triton/tidepoolunit/Rubrics/collrubric.html
Collaboration Rubric

4 - Thorough Understanding

- Consistently and actively works toward group goals.
- Is sensitive to the feelings and learning needs of all group members.
- Willingly accepts and fulfills individual role within the group.
- Consistently and actively contributes knowledge, opinions, and skills.
- Values the knowledge, opinion and skills of all group members and encourages their contribution.
- Helps group identify necessary changes and encourages group action for change.

3 - Good Understanding

- Works toward group goals without prompting.
- Accepts and fulfills individual role within the group.
- Contributes knowledge, opinions, and skills without prompting.
- Shows sensitivity to the feelings of others.
- Willingly participates in needed changes.

2 - Satisfactory Understanding

- Works toward group goals with occasional prompting.
- Contributes to the group with occasional prompting.
- Shows sensitivity to the feelings of others.
- Participates in needed changes, with occasional prompting.

1 - Needs Improvement

- Works toward group goals only when prompted.
- Contributes to the group only when prompted.
- Needs occasional reminders to be sensitive to the feelings of others.
- Participates in needed changes when prompted and encouraged.

http://www.sdcoe.k12.ca.us/score/acibank/collaborub.html
<table>
<thead>
<tr>
<th>Scoring Level</th>
<th>Interpretation</th>
<th>Analysis &amp; Evaluation</th>
<th>Presentation</th>
</tr>
</thead>
</table>
| 4 - Accomplished | Analyzes insightful questions  
Refutes bias  
Critiques content  
Examines inconsistencies  
Values information | Examines conclusions  
Uses reasonable judgment  
Discriminates rationally  
Synthesizes data  
Views information critically | Argues succinctly  
Discusses issues thoroughly  
Shows intellectual honesty  
Justifies decisions  
Assimilates information |
| 3 - Competent  | Asks insightful questions  
Detects bias  
Categorizes content  
Identifies inconsistencies  
Recognizes context | Formulates conclusions  
Recognizes arguments  
Notices differences  
Evaluates data  
Seeks out information | Argues clearly  
Identifies issues  
Attributes sources naturally  
Suggests solutions  
Incorporates information |
| 2 - Developing | Identifies some questions  
Notes some bias  
Recognizes basic content  
States some inconsistencies  
Selects sources adequately | Identifies some conclusions  
Sees some arguments  
Identifies some differences  
Paraphrases data  
Assumes information valid | Misconstructs arguments  
Generalizes issues  
Cites sources  
Presents few options  
Overlooks some information |
| 1 - Beginning  | Fails to question data  
Ignores bias  
Misses major content areas  
Detects no inconsistencies  
Chooses biased sources | Fails to draw conclusions  
Sees no arguments  
Overlooks differences  
Repeats data  
Omits research | Omits argument  
Misrepresents issues  
Excludes data  
Draws faulty conclusions  
Shows intellectual dishonesty |
### RUBRIC TEMPLATE

**Student Outcome: Critical Thinking**

<table>
<thead>
<tr>
<th></th>
<th>1-Beginning</th>
<th>2-Developing</th>
<th>3-Competent</th>
<th>4-Accomplished</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Interpretation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Questions</td>
<td>Fails to question data</td>
<td>Identifies some questions</td>
<td>Asks insightful questions</td>
<td>Analyzes insightful questions</td>
</tr>
<tr>
<td>Recognizes Bias</td>
<td>Ignores bias</td>
<td>Notes some bias</td>
<td>Detects bias</td>
<td>Refutes bias</td>
</tr>
<tr>
<td>Understands</td>
<td>Misses major content areas</td>
<td>Recognizes basic content</td>
<td>Categorizes content</td>
<td>Critiques content</td>
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<tr>
<td>content</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Identifies</td>
<td>Detects no inconsistencies</td>
<td>States some inconsistencies</td>
<td>Identifies inconsistencies</td>
<td>Examines inconsistencies</td>
</tr>
<tr>
<td>inconsistencies</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Understands</td>
<td>Chooses biased sources</td>
<td>Selects sources adequately</td>
<td>Recognizes context</td>
<td>Values information</td>
</tr>
<tr>
<td>Context</td>
<td></td>
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<td></td>
</tr>
<tr>
<td><strong>Analysis and Evaluation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reaches Conclusions</td>
<td>Fails to draw conclusions</td>
<td>Identifies some conclusions</td>
<td>Formulates conclusions</td>
<td>Examines conclusions</td>
</tr>
<tr>
<td>Develops</td>
<td>Sees no arguments</td>
<td>Sees some arguments</td>
<td>Recognizes arguments</td>
<td>Uses reasonable judgment</td>
</tr>
<tr>
<td>Arguments</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discriminates</td>
<td>Overlooks differences</td>
<td>Identifies some differences</td>
<td>Notices differences</td>
<td>Discriminates rationally</td>
</tr>
<tr>
<td>Synthesizes</td>
<td>Repeats data</td>
<td>Paraphrases data</td>
<td>Evaluates data</td>
<td>Synthesizes data</td>
</tr>
<tr>
<td>Data</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Gathers</td>
<td>Omits research</td>
<td>Assumes information valid</td>
<td>Seeks out information</td>
<td>Views information critically</td>
</tr>
<tr>
<td>Information</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Presentation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Makes Arguments</td>
<td>Omits arguments</td>
<td>Misconstructs arguments</td>
<td>Argues clearly</td>
<td>Argues succinctly</td>
</tr>
<tr>
<td>Identifies</td>
<td>Misrepresents issues</td>
<td>Generalizes issues</td>
<td>Identifies issues</td>
<td>Discusses issues thoroughly</td>
</tr>
<tr>
<td>Issues</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gives Attribution</td>
<td>Excludes data</td>
<td>Cites sources</td>
<td>Attributes sources naturally</td>
<td>Shows intellectual honesty</td>
</tr>
<tr>
<td>Reaches</td>
<td>Draws faulty conclusions</td>
<td>Presents few options</td>
<td>Suggests solutions</td>
<td>Justifies decisions</td>
</tr>
<tr>
<td>Conclusions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incorporates</td>
<td>Shows intellectual dishonesty</td>
<td>Overlooks some information</td>
<td>Incorporates information</td>
<td>Assimilates information</td>
</tr>
<tr>
<td>Information</td>
<td></td>
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</tbody>
</table>
# Rubric Template

**Student Outcome:** Critical Thinking

<table>
<thead>
<tr>
<th>Interpretation</th>
<th>1-Beginning</th>
<th>2-Developing</th>
<th>3-Competent</th>
<th>4-Accomplished</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identifies inconsistencies</td>
<td>Detects no inconsistencies</td>
<td>States some inconsistencies</td>
<td>Identifies inconsistencies</td>
<td>Examines inconsistencies</td>
</tr>
<tr>
<td>Understands Context</td>
<td>Chooses biased sources</td>
<td>Selects sources adequately</td>
<td>Recognizes context</td>
<td>Values information</td>
</tr>
</tbody>
</table>

## Analysis and Evaluation

<table>
<thead>
<tr>
<th>Reaches Conclusions</th>
<th>1-Beginning</th>
<th>2-Developing</th>
<th>3-Competent</th>
<th>4-Accomplished</th>
</tr>
</thead>
<tbody>
<tr>
<td>Synthesizes Data</td>
<td>Repeats data</td>
<td>Paraphrases data</td>
<td>Synthesizes data</td>
<td>Evaluates data</td>
</tr>
</tbody>
</table>

## Presentation

<table>
<thead>
<tr>
<th>Gives Attribution</th>
<th>1-Beginning</th>
<th>2-Developing</th>
<th>3-Competent</th>
<th>4-Accomplished</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reaches Conclusions</td>
<td>Draws faulty conclusions</td>
<td>Presents few options</td>
<td>Suggests solutions</td>
<td>Justifies decisions</td>
</tr>
</tbody>
</table>

*Faculty Workshop - Gloria Rogers, ABET, Inc.*

Modified from “General Education Scoring Guide for Critical Thinking” California State University, by Gloria Rogers, grogers@abet.org
### Rubric to Evaluate the Quality of a Rubric

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Needs to be reworked</th>
<th>Acceptable but needs more clarity if used for high stakes testing</th>
<th>Clearly written</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance levels addressed</td>
<td>Scoring guide is open-ended</td>
<td>Scoring guide provides for different performance levels</td>
<td>The scoring guide is descriptive of each level of performance</td>
</tr>
<tr>
<td>Description of performance levels</td>
<td>There are no specific descriptions of the different performance levels</td>
<td>Differences between the levels rely on looking for a number of examples or responses</td>
<td>The descriptions define clear and significant differences between the performance levels</td>
</tr>
<tr>
<td>Language specificity</td>
<td>Vague words are used to discriminate between levels: Some, many, few, good, excellent</td>
<td>Subjective words (good, excellent, some) are used to discriminate between levels, but are further defined</td>
<td>The critical attributes between each level of performance are included</td>
</tr>
<tr>
<td>Usefulness</td>
<td>Ratings do not provide useful instruction</td>
<td>Ratings provide instructional information that needs further task analysis</td>
<td>Ratings provide useful instructional information</td>
</tr>
</tbody>
</table>

Developed by SBE Design Team, Northern Colorado BOCES, through a Partnerships/Goals 2000 local grant. © 1997 Permission given to duplicate and to modify these materials, May, 1997.
Curriculum Map Example
Modified from RosE-Portfolio © Rose-Hulman Institute of Technology

Performance Criteria Explicit: This performance is explicitly stated as being a learning outcome for this course.
Demonstrate Competence: Students are asked to demonstrate their competence on this performance criterion through homework, projects, test, etc.
Formal Feedback: Students are given formal feedback on their performance on this criterion.
Not covered: This performance criterion is not addressed in this way in this course.

Note: Clicking on the link 'view rubric' will show you scoring rubric for that particular performance criterion related to the outcome.

<table>
<thead>
<tr>
<th>Performance Criteria</th>
<th>Outcome Explicit</th>
<th>Demonstrate Competence</th>
<th>Formal Feedback</th>
<th>Not Covered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recognition of ethical and professional responsibilities.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Demonstrate knowledge of professional codes of ethics. View rubric or make a</td>
<td>□ Yes</td>
<td>□ Yes</td>
<td>□ Yes</td>
<td>□</td>
</tr>
<tr>
<td>comment (optional)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Evaluate the ethical dimensions of professional engineering, mathematical, and</td>
<td>□ Yes</td>
<td>□ Yes</td>
<td>□ Yes</td>
<td>□</td>
</tr>
<tr>
<td>scientific practices. View rubric or make a comment (optional)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>An ability to work effectively in a team.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>1. Share responsibilities and duties, and take on different roles when applicable.</td>
<td>□ Yes</td>
<td>□ Yes</td>
<td>□ Yes</td>
<td>□</td>
</tr>
<tr>
<td>View rubric or make a comment (optional)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Analyze ideas objectively to discern feasible solutions by building consensus.</td>
<td>□ Yes</td>
<td>□ Yes</td>
<td>□ Yes</td>
<td>□</td>
</tr>
<tr>
<td>View rubric or make a comment (optional)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Develop a strategy for action. View rubric or make a comment (optional)</td>
<td>□ Yes</td>
<td>□ Yes</td>
<td>□ Yes</td>
<td>□</td>
</tr>
<tr>
<td>An ability to communicate effectively in oral, written, graphical, and visual forms.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Identify the readers/audience, assess their previous knowledge and informational</td>
<td>□ Yes</td>
<td>□ Yes</td>
<td>□ Yes</td>
<td>□</td>
</tr>
<tr>
<td>needs, and organize/design information to meet those needs. View rubric or make a</td>
<td></td>
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<tr>
<td>comment (optional)</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>2. Provide content that is factually correct, supported with evidence, explained</td>
<td>□ Yes</td>
<td>□ Yes</td>
<td>□ Yes</td>
<td>□</td>
</tr>
<tr>
<td>with sufficient detail, and properly documented. View rubric or make a comment</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(optional)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Test readers/audience response to determine how well ideas have been relayed.</td>
<td>□ Yes</td>
<td>□ Yes</td>
<td>□ Yes</td>
<td>□</td>
</tr>
<tr>
<td>View rubric or make a comment (optional)</td>
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<tr>
<td>4. Submit work with a minimum of errors in spelling, punctuation, grammar, and</td>
<td>□ Yes</td>
<td>□ Yes</td>
<td>□ Yes</td>
<td>□</td>
</tr>
<tr>
<td>usage. View rubric or make a comment (optional)</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
# Business Administration Competencies/Expected Outcomes for the Common Professional Component

<table>
<thead>
<tr>
<th>Business Administration Map</th>
<th>Macro-Economics</th>
<th>Micro-Economic</th>
<th>Microcomputer App for Bus</th>
<th>Writing for Bus</th>
<th>Pre-Cal (Bus)</th>
<th>Intro to Bus</th>
<th>Busi 203</th>
<th>Busi 211</th>
<th>Busi 231</th>
<th>Busi 241</th>
<th>Busi 251</th>
<th>Busi 252</th>
<th>Busi 281</th>
<th>Busi 371</th>
<th>Busi 411</th>
</tr>
</thead>
<tbody>
<tr>
<td>I = Introduce; R = Reinforce; E = Emphasize</td>
<td>Econ 207</td>
<td>Econ 208</td>
<td>CS 214</td>
<td>Eng 200</td>
<td>Math 1185</td>
<td>Busi 201</td>
<td>Busi 203</td>
<td>Busi 211</td>
<td>Busi 231</td>
<td>Busi 241</td>
<td>Busi 251</td>
<td>Busi 252</td>
<td>Busi 281</td>
<td>Busi 371</td>
<td>Busi 411</td>
</tr>
</tbody>
</table>

## Writing Competencies

1. Identify a subject and formulate a thesis statement.
   - I
   - R
   - E

2. Organize ideas to support a position.
   - I
   - R
   - R
   - E

3. Write in a unified and coherent manner appropriate to the subject matter.
   - I
   - R
   - R
   - E

4. Use appropriate sentence structure and vocabulary.
   - I
   - R
   - R
   - E

5. Document references and citations according to an accepted style manual.
   - I
   - R
   - R
   - E

## Critical Thinking Competencies

1. Identify business problems and apply creative solutions.
   - I
   - R
   - R
   - R
   - E

2. Identify and apply leadership techniques.
   - I
   - R
   - E

3. Translate concepts into current business environments.
   - I
   - R
   - R
   - R
   - E

4. Analyze complex problems by identifying and evaluating the components of the problem.
   - I
   - R
   - R
   - E
   - E

---

"Assessing for Learning" by Peggy L. Maki, Stylus Publishing, 2004
Source: New Jersey City University Business Administration Program
<table>
<thead>
<tr>
<th>Course Title</th>
<th>Econ 207</th>
<th>Econ 208</th>
<th>CS 214</th>
<th>Eng 200</th>
<th>Math 1165</th>
<th>Busi 201</th>
<th>Busi 211</th>
<th>Busi 231</th>
<th>Busi 241</th>
<th>Busi 251</th>
<th>Busi 252</th>
<th>Busi 281</th>
<th>Busi 371</th>
<th>Busi 411</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Quantitative Reasoning Competencies</strong></td>
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</tr>
<tr>
<td>Apply quantitative methods to solving real-world problems.</td>
<td>I</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>E</td>
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<tr>
<td>Perform necessary arithmetic computations to solve quantitative problems.</td>
<td>I</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>E</td>
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</tr>
<tr>
<td>Evaluate information presented in tabular, numerical, and graphical form.</td>
<td>I</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>E</td>
<td>E</td>
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<td></td>
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</tr>
<tr>
<td>Recognize the reasonableness of numeric answers.</td>
<td>I</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>E</td>
<td>E</td>
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<tr>
<td><strong>Oral Communications Competencies</strong></td>
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<tr>
<td>Organize an oral argument in logical sequence that will be understood by the audience.</td>
<td>I</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>E</td>
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<td></td>
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<tr>
<td>Use visual aids effectively to support an oral presentation.</td>
<td>I</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>E</td>
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</tr>
<tr>
<td>Demonstrate professional demeanor, speak clearly in well-modulated tone, and engage the audience.</td>
<td>I</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>E</td>
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</tr>
<tr>
<td>Exhibit good listening skills when others are speaking.</td>
<td>I</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>E</td>
<td></td>
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</tr>
<tr>
<td><strong>Technology and Information Literacy</strong></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Identify problem/topic.</td>
<td>I</td>
<td>R</td>
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<td>R</td>
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</tr>
<tr>
<td>Demonstrate familiarity with information resources and technology.</td>
<td>I</td>
<td>R</td>
<td></td>
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<td>R</td>
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</tr>
<tr>
<td>Conduct search query.</td>
<td>I</td>
<td>R</td>
<td></td>
<td></td>
<td>R</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evaluate sources of information</td>
<td>I</td>
<td>R</td>
<td></td>
<td></td>
<td>R</td>
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</tr>
</tbody>
</table>

*Assessing for Learning* by Peggy L Maki, Stylus Publishing, 2004
Source: New Jersey City University Business Administration Program
Assessment Methods*

1. **Written surveys and questionnaires** ( Asking individuals to share their perceptions about the study target—e.g., their own or others’ skills/attitudes/behavior, or program/course qualities and attributes).

2. **Exit and other interviews** (asking individuals to share their perceptions about the target of study—e.g., their own skills/attitudes, skills and attitudes of others, or program qualities—in a face-to-face dialog with an interviewer).

3. **Commercial, norm-referenced, standardized examinations** (commercially developed examinations, generally group administered, mostly multiple choice, “objective” tests, usually purchased from a private vendor).

4. **Locally developed examinations** (objective or subjective designed by local staff/faculty);

5. **Archival Records** (biographical, academic, or other file data available from college or other agencies and institutions).

6. **Focus groups** (guided discussion of a group of people who share certain characteristics related to the research or evaluation question, conducted by trained moderator).

7. **Portfolios** (collections of work samples, usually compiled over time and rated using rubrics).

8. **Simulations** (a competency based measure where a person’s abilities are measured in a situation that approximates a “real world” setting. Simulation is primarily used when it is impractical to observe a person performing a task in a real world situation (e.g., on the job).

9. **Performance Appraisals** (systematic measurement of overt demonstration of acquired skills, generally through direct observation in a "real world" situation—e.g., while student is working on internship or on project for client).

10. **External Examiner** (using an expert in the field from outside your program — usually from a similar program at another institution — to conduct, evaluate, or supplement the assessment of your students).

11. **Oral examinations** (evaluation of student knowledge levels through a face-to-face dialogue between the student and the examiner—usually faculty).

12. **Behavioral Observations** (measuring the frequency, duration and context of subject’s actions, usually in a natural setting with non-interactive methods).

*Except where noted, materials relating to the pro’s and con’s of assessment methods have been modified by Gloria Rogers and used with permission. Prus, J. and Johnson, R., "Assessment & Testing Myths and Realities." New Directions for Community Colleges, No. 88, Winter 94. These materials cannot be duplicated without the expressed written consent of the authors.
GLOSSARY*

Backload (--ed, --ing): amount of effort required after the data collection.

Competency: level at which performance is acceptable.

Confounded: confused.

Convergent validity: general agreement among ratings, gathered independently of one another, where measures should be theoretically related.

Criterion-referenced: criterion-referenced tests determine what test takers can do and what they know, not how they compare to others. Criterion-referenced tests report how well students are doing relative to a pre-determined performance level on a specified set of educational goals or outcomes included in the curriculum.

Externality: Externality refers to the extent to which the results of the assessment can be generalized to a similar context.

External validity: External validity refers to the extent to which the results of a study are generalizable or transferable to other settings. Generalizability is the extent to which assessment findings and conclusions from a study conducted on a sample population can be applied to the population at large. Transferability is the ability to apply the findings in one context to another similar context.

Forced-choice: the respondent only has a choice among given responses (e.g., very poor, poor, fair, good, very good).

Formative assessment: intended to assess ongoing program/project activity and provide information to improve the project. Assessment feedback is short term in duration.

Frontload (--ed, --ing): amount of effort required in the early stage of assessment method development or data collection.

Generalization (generalizability): The extent to which assessment findings and conclusions from a study conducted on a sample population can be applied to the population at large.

Goal-free evaluation: Goal-free evaluation focuses on actual outcomes rather than intended program outcomes. Evaluation is done without prior knowledge of the goals of the program.

Inter-rater reliability: the degree to which different raters/observers give consistent estimates of the same phenomenon.

Internal validity: Internal validity refers to (1) the rigor with which the study was conducted (e.g., the study's design, the care taken to conduct measurements, and decisions concerning what was and wasn't measured) and (2) the extent to which the designers of a study have taken into account alternative explanations for any causal relationships they explore.

Longitudinal studies: Data collected from the same population at different points in time.

Norm (--ative): a set standard of development or achievement usually derived from the average or median achievement of a large group.

Norm-reference: A norm-referenced test is designed to highlight achievement differences between and among students to produce a dependable rank order of students across a continuum of achievement from high achievers to low achievers.

Observer effect: the degree to which the assessment results are affected by the presence of an observer.
Open-ended: assessment questions that are designed to permit spontaneous and unguided responses.

Operationalize: defining a term or object so that it can be measured. Generally states the operations or procedures used that distinguish it from others.

Reliability: Reliability is the extent to which an experiment, test, or any measuring procedure yields the same result on repeated trials.

Rubrics: A rubric is a set of categories that define and describe the important components of the work being completed, critiqued, or assessed. Each category contains a gradation of levels of completion or competence with a score assigned to each level and a clear description of what criteria need to be met to attain the score at each level.

Salience: a striking point or feature.

Stakeholder: Anyone who has a vested interest in the outcome of the program/project.

Summative assessment: assessment that is done at the conclusion of a course or some larger instructional period (e.g., at the end of the program). The purpose is to determine success or to what extent the program/project/course met its goals.

Third party: person(s) other than those directly involved in the educational process (e.g., employers, parents, consultants).

Triangulate (triangulation): The use of a combination of assessment methods in a study. An example of triangulation would be an assessment that incorporated surveys, interviews, and observations.

Topology: Mapping of the relationships among subjects.

Utility: usefulness of assessment results.

Variable (variability): Observable characteristics that vary among individuals responses.

Validity: Validity refers to the degree to which a study accurately reflects or assesses the specific concept that the researcher is attempting to measure. Validity has three components:

- relevance - the option measures your educational objective as directly as possible
- accuracy - the option measures your educational objective as precisely as possible
- utility - the option provides formative and summative results with clear implications for educational program evaluation and improvement

*Prepared for use with Faculty Workshop ONLY—grogers@abet.org
Written Surveys/Questionnaires

Definition: Asking individuals to share their perceptions about the study target—e.g., their own or others skills/attitudes/behavior, or program/course qualities and attributes.

Advantages:
- Typically yield the perspective that students, alumni, the public, etc., have of the institution that may lead to changes especially beneficial to relationships with these groups.
- Can cover a broad range of attributes within a brief period of time.
- Results tend to be more easily understood by lay persons.
- Can cover areas of development, which might be difficult or costly to assess more directly.
- Can provide accessibility to individuals who otherwise would be difficult to include in assessment efforts (e.g., alumni, parents, employers).

When ‘third-parties’ are completing the survey/questionnaire there are additional advantages, as follows:
- Can provide unique stakeholder input, valuable in its own right (especially employers and parents). How is the course/program/college serving their purposes?
- Offer different perspectives, presumably less biased than either student or assessor.
- Enable recognition and contact with important, often under-valued constituents. Relations may improve by just asking for their input.
- Can increase both internal validity (through “convergent validity” “triangulation” with other data) and external validity.
- Convey a sense of importance regarding the opinions of stakeholder groups

Disadvantages:
- Results tend to be highly dependent on wording of items, salience of survey or questionnaire, and organization of instrument. Thus, good surveys and questionnaires are more difficult to construct than they appear.
- Frequently rely on volunteer samples, which can be biased.
- Mail surveys tend to yield low response rates.
- Require careful organization in order to facilitate data analysis via computer for large samples.
- Commercially prepared surveys tend not to be entirely relevant to an individual institution and its students.
- Forced response choices (forced-choice) may not provide opportunities for respondents to express their true opinions.
- Results reflect perceptions, which individuals are willing to report and thus tend to consist of indirect data.
- Locally developed instrument may not provide for externality of results.

Third party disadvantages also include:
- As with any indirect data, inference and reports can contain a high degree of error.
- Third-parties can be biased too, in directions more difficult to anticipate than self-reports.
- Less investment by third-parties in assessment processes often means lower response rates, even lower than student/alumni rates.
- Usually requires logistical details (e.g., identifying sample, making contact, getting useful responses, etc.), therefore more costly than it looks.
- If information about specific individuals is requested, confidentiality becomes an important and sometimes problematic issue that must be addressed carefully.
Ways to Reduce Disadvantages:
- Use only carefully constructed instruments that have been reviewed by survey experts
- Include open-ended, respondent worded items along with forced-choice.
- If random sampling or surveying of the entire target population is not possible, obtain the maximum sample size possible and follow-up with non-respondents (preferably in person or by phone).
- If commercially prepared surveys are used, add locally developed items of relevance to the institution.
- If locally developed surveys are used, attempt to include at least some externally-referenced items (e.g., from surveys for which national data are available).
- Word reports cautiously to reflect the fact that results represent perceptions and opinions respondents are willing to share publicly.
- Use pilot or “try out” samples in local development of instruments and request formative feedback from respondents on content clarity, sensitivity, and format.
- Cross-validate results through other sources of data through triangulation.

Ways to Reduce Third Party Disadvantages:
- Very careful, explicit directions for types of responses requested can reduce variability.
- Attain informed consent in cases where information about specific individuals is being requested.
- Coordinate contacts with other campus organizations contacting the same groups, to reduce (“harassment” syndrome) and increase response rates.

Bottom Lines:
A relatively inexpensive way to collect data on important evaluative topics from a large number of respondents. Must always be treated cautiously, however, since results only reflect what subjects are willing to report about their perception of their attitudes and/or behaviors.
Exit and Other Interviews

Definition: Asking individuals to share their perceptions of their own attitudes and/or behaviors or those of others. Evaluating student reports of their attitudes and/or behaviors in a face-to-face dialogue.

Advantages:
Student interviews tend to have most of the attributes of surveys and questionnaires with the exception of requiring direct contact, which may limit accessibility to certain populations. Exit interviews provide the following advantages:
- Allow for more individualized questions and follow-up probes based on the responses of interviewees.
- Provide immediate feedback to interviewer.
- Include same observational and formative advantages as oral examinations.
- Frequently yield benefits beyond data collection that comes from opportunities to interact with students and other groups.
- Can include a greater variety of items than is possible on surveys and questionnaires, including those that provide more direct measures of learning and development.

When ‘third-parties’ are making the reports there are additional advantages, as follows:
- Can provide unique stakeholder input, valuable in its own right (especially employers and parents). How is the college/program/project/course serving the purposes of the stakeholder group?
- Offer different perspectives, presumably less biased than either student or the assessor.
- Enable recognition and contact with important, often under-valued constituents.
  Relations may improve by just asking for their input.
- Can increase both internal validity (through “convergent validity”/“triangulation” with other data) and external validity (by adding more “natural” perspective).

Disadvantages:
- Requires direct contact, which may be difficult to arrange.
- May be intimidating to interviewees, thus biasing results in the positive direction.
- Results tend to be highly dependent on wording of items and the manner in which interviews are conducted.
- Time consuming, especially if large numbers of persons are to be interviewed.

Third party report disadvantages:
- As with any indirect data, inference and reports risk high degree of error.
- Third parties can be biased too, in directions more difficult to anticipate than self-reports.
- Usually requires logistical details (e.g., identifying sample, making contact, getting useful responses, etc.), therefore more costly than it looks.
- If information about specific individuals is requested, confidentiality becomes an important and sometimes problematic issue that must be addressed carefully.

Ways to Reduce Disadvantages:
- Plan the interviews carefully with assistance from experts.
- Provide training sessions for interviewers that include guidance in putting interviewees at ease and related interview skills.
- Interview purposeful samples of students when it is not feasible to interview all.
- Conduct telephone interviews when face-to-face contact is not feasible.
- Develop an interview format and questions with a set time limit in mind.
- Conduct pilot testing of interview and request feedback from interviewee to improve the interview process.
- Utilize focus groups when individual interviewing is not possible or is too costly.

Ways to Reduce Third Party Disadvantages:
- Conduct face-to-face or phone interviews wherever possible, increasing validity through probing during dialogue.
- Very careful, explicit directions for types and perspectives of responses requested can reduce variability. Attain informed consent in cases where information about individuals is being requested.
- Coordinate contacts with other campus organizations contacting the same groups, to reduce "harassment" syndrome and increase response rates.

Bottom Lines:
Interviews provide opportunities to cover a broad range of content and to interact with respondents. Opportunities to follow-up responses can be very valuable. Direct contact may be difficult to arrange, costly, and potentially threatening to respondents unless carefully planned.
Commercial, Norm-Referenced, Standardized Exams

Definition: Group administered mostly or entirely multiple-choice, “objective" tests in one or more curricular areas. Scores are based on comparison with a reference or norm group. Typically must be purchased from a private vendor.

Target of Method: Used primarily on students in individual programs, courses or for a particular student cohort.

Advantages:
- Can be adopted and implemented quickly.
- Reduce/eliminate faculty time demands in instrument development and grading (i.e., relatively low “frontloading” and “backloading” effort)
- Objective scoring
- Provide for externality of measurement (i.e., externality validity is the degree to which the conclusions in your study would hold for other persons in other places and at other times—ability to generalize the results beyond the original test group)
- Provide norm group(s) comparison often required by mandates.
- May be beneficial or required in instances where state or national standards exist for the discipline or profession.
- Very valuable for benchmarking and cross-institutional comparison studies.

Disadvantages:
- May limit what can be measured.
- Eliminates the process of learning and clarification of goals and objectives typically associated with local development of measurement instruments.
- Unlikely to completely measure or assess the specific goals and objectives of a program, department, or institution.
- “Relative standing” results tend to be less meaningful than criterion-referenced (define & insert) results for program/student evaluation purposes.
- Norm-referenced data is dependent on the institutions in comparison group(s) and methods of selecting students to be tested. (Caution: unlike many norm-referenced tests such as those measuring intelligence, present norm-referenced tests in higher education do not utilize, for the most part, randomly selected or well stratified national samples.)
- Group administered multiple-choice tests always include a potentially high degree of error, largely uncorrectable by “guessing correction” formulae (which lowers validity).
- Results unlikely to have direct implications for program improvement or individual student progress.
- Results highly susceptible to misinterpretation/misuse both within and outside the institution.
- Someone must pay for obtaining these examinations; either the student or program.
- If used repeatedly, there is a concern that faculty may teach to the exam as is done with certain AP high school courses.

Ways to Reduce Disadvantages:
- Choose the test carefully, and only after faculty have reviewed available instruments and determined a satisfactory degree of match between the test and the learning outcomes of the curriculum.
- Request and review technical data, especially reliability and validity data and information on normative sample from test publishers.
- Utilize on-campus measurement experts to review reports of test results and create more customized summary reports for the institution, faculty, etc.
- Whenever possible, choose tests that also provide **criterion-referenced** results
- Assure that such tests are only one aspect of a multi-method approach in which no firm conclusions based on **norm-referenced** data are reached without **validation** from other sources (**triangulation**).

**Bottom Lines:**
Relatively quick, and easy, but useful mostly where group-level performance and external comparisons of results are required. Not as useful for individual student or program evaluation. May not only be ideal, but many times the only alternative for benchmarking studies.
Locally Developed Exams

Definition: Objective and/or subjective tests designed by faculty of the program or course sequence being evaluated.

Advantages:
- Content and style can be geared to specific goals, objectives, and student characteristics of the program, curriculum, etc.
- Specific criteria for performance can be established in relationship to curriculum.
- Process of development can lead to clarification/crystallization of what is important in the process/content of student learning.
- Local grading by faculty can provide relatively rapid feedback.
- Greater faculty/institutional control over interpretation and use of results.
- More direct implication of results for program improvements.

Disadvantages:
- Require considerable leadership/coordination, especially during the various phases of development.
- Cannot be used for benchmarking, or cross-institutional comparisons.
- Costly in terms of time and effort (more "frontloaded" effort for objective exams; more "backloaded" effort for subjective exams).
- Demands expertise in measurement to assure validity/reliability/utility.
- May not provide for externality.

Ways to Reduce Disadvantages:
- Enter into consortium with other programs, departments, or institutions with similar goals and objectives as a means of reducing costs associated with developing instruments. An element of externality is also added through this approach.
- Utilize on-campus measurement experts whenever possible for test construction and validation.
- Contract with faculty "consultants" to provide development and grading.
- Incorporate outside experts, community leaders, etc. into development and grading process.
- Embed in program requirements for maximum relevance with minimum disruption (e.g., a "capstone" course).
- Validate results through use of multi-method approach (triangulation).

Bottom Lines:
Most useful for individual coursework or program evaluation, with careful adherence to measurement principles. Must be supplemented for external validity.
Archival Records

**Definition:** Biographical, academic, or other file data available from the college or other agencies and institutions.

**Advantages:**
- Tend to be accessible, thus requiring minimal effort.
- Build upon data collection efforts that have already occurred.
- Can be cost efficient if required date is readily retrievable in desired format.
- Constitute non-intrusive measurement, not requiring additional time or effort from students or other groups.
- Very useful for longitudinal studies.
- Good way to establish a baseline for before and after comparisons.

**Disadvantages:**
- Especially in large institutions, may require considerable effort and coordination to determine exactly what data are available campus-wide and to then get that information in desired format.
- To be most helpful, datasets need to be combined. This requires an ability to download and combine specific information for multiple sources. It may require designing a separate database for this downloaded information.
- Typically the archived data are not exactly what is required, so that the evaluator must make compromises. In some cases, it may be a stretch to use such data as surrogates for the desired measures.
- If individual records are included, protection of rights and confidentiality must be assured; where applicable, Institutional Review Board approval should be obtained if there is doubt.
- Availability of data may discourage the development of other, more appropriate measures or data sources.
- May encourage attempts to “find ways to use data” rather than assessment related to specific goals and objectives.

**Ways to Reduce Disadvantages:**
- Early-on in the development of an assessment program, conduct a comprehensive review of existing assessment and evaluation efforts and data typically being collected throughout the institution and its units (i.e., “campus data map”). An Office of Institutional Research is found on many campuses and can be helpful in this process.
- Be familiar with the Family Educational Rights and Privacy Act (Buckley Amendment) and avoid personally identifiable data collection without permission. Assure security/protection of records.
- Only use archival records that are relevant to specific goals and objectives of learning and development.

**Bottom Lines:**
Can be quick, easy, and cost-effective method, if data are available and accessible. Usually limited data quality but integral to valuable longitudinal comparisons. Should be a standard component of all assessment programs.
FOCUS GROUPS**

Definition: Typically conducted with 7-12 individuals who share certain characteristics that are related to a particular topic related to a research or evaluation question. Group discussions are conducted by a trained moderator with participants (several times, if possible) to identify trends/patterns in perceptions. Moderator's purpose is to provide direction and set the tone for the group discussion, encourage active participation from all group members, and manage time. Moderator must not allow own biases to enter, verbally or nonverbally. Careful and systematic analysis of the discussions provides information that can be used to evaluate and/or improve the desired outcome.

Advantages:
- Useful to gather ideas, details, new insights and to improve question design.
- Helpful in the design of surveys.
- Can be used to get more in-depth information on issues identified by a survey.
- Can inform the interpretation of results from mail or telephone surveys.
- Can be used in conjunction with quantitative studies to confirm/broaden one's understanding of an issue.
- Interaction among focus group participants often leads to new insights.
- Allows the moderator to probe and explore unanticipated issues.

Disadvantages:
- Not suited for generalizations about population being studied.
- Not a substitute for systematic evaluation procedures.
- Moderators require training.
- Differences in the responses between/among groups can be troublesome.
- Groups can be difficult to assemble.
- Moderator has less control than in individual interviews.
- Data are complex to analyze.

Ways to Reduce Disadvantages:
- Offer an incentive for participants if possible.
- Over-recruit participants.
- Train moderators to use open-ended questions, pauses and probes, and learn when and how to move into new topic areas.

Example of Applications:
- Focus groups can be held to provide in-depth information of interest generated from a survey. Focus groups can be used as a follow-up to survey data. In cases where the results of a survey do not meet the expected standard on a particular outcome, a focus group of participants who are representative of the population surveyed (e.g., students, alumni, females) could be held to further investigate the results. For example, if the analysis of the questionnaires of senior students indicates that they, generally, did not feel they had adequate communication skills, a focus group of senior students could be established to examine why they believe students responded that way and what they would suggest to improve the development of communication skills.
- Focus groups can be used to get input from alumni or business partners on the strengths and weaknesses in the knowledge and/or skills of graduates. Focus groups are a particularly helpful tool to use to "triangulate" or validate the results from other assessment methods.

Bottom Lines:
Focus groups are a quick and, if locally done, inexpensive method of gathering information. They should be conducted by someone who has training and experience in
conducting Focus Groups and analysis of Focus Group data. They are very useful for triangulation to support other assessment methods but they are not a substitute for systematic evaluation procedures. Focus Groups should meet the same rigor as other assessment methods and should be developed and analyzed according to sound qualitative practices.

**Prepared by Gloria Rogers, ABET, Inc.**
Portfolios

Definition: Collections of multiple student work samples usually compiled over time and rated using rubrics. The design of a portfolio is dependent upon how the scoring results are going to be used.

Advantages:
- Can be used to view learning and development longitudinally (e.g., samples of student writing over time can be collected), which is a useful perspective.
- Multiple components of a curriculum can be measured (e.g., writing, critical thinking, research skills) at the same time.
- Samples in a portfolio are more likely than test results to reflect student ability when pre-planning, input from others, and similar opportunities common to most work settings are available (which increases generalizability/external validity of results).
- The process of reviewing and scoring portfolios provides an excellent opportunity for faculty exchange and development, discussion of curriculum goals and objectives, review of scoring criteria, and program feedback.
- Economical in terms of student time and effort, since no separate "assessment administration" time is required.
- Greater faculty control over interpretation and use of results.
- Results are more likely to be meaningful at all levels (i.e., the individual student, program, or institution) and can be used for diagnostic/prescriptive purposes as well.
- Avoids or minimizes "test anxiety" and other "one shot" measurement problems.
- Increases "power" of maximum performance measures over more artificial or restrictive "speed" measures on test or in-class sample.
- Increases student participation (e.g., selection, revision, evaluation) in the assessment process.

Disadvantages:
- Can be costly in terms of evaluator time and effort.
- Management of the collection and scoring process, including the establishment of reliable and valid scoring rubrics, is likely to be challenging.
- May not provide for externality.
- If samples to be included have been previously submitted for course grades, faculty may be concerned that a hidden agenda of the process is to validate their grading.
- Security concerns may arise as to whether submitted samples are the students' own work, or adhere to other measurement criteria.

Ways to Reduce Disadvantages:
- Consider having portfolios submitted as part of a course requirement, especially a "capstone course" at the end of a program.
- Investigate the use of electronic portfolios as a means to increase process efficiency.
- Utilize portfolios from representative samples of students rather than having all students participate (this approach may save considerable time, effort, and expense but be problematic in other ways).
- Have more than one rater for each portfolio; establish inter-rater reliability through piloting designed to fine-tune rating criteria.
- Provide training for raters.
- Recognize that portfolios in which samples are selected by the students are likely represent their best work.
- Cross-validate portfolio products with more controlled student work samples (e.g., in-class tests and reports) for increased validity and security.
Bottom Lines:
Portfolios are a potentially valuable option adding important longitudinal and "qualitative" data, in a more natural way. Particular care must be taken to maintain validity. Especially good for multiple-learning outcomes assessment.
Simulations

Definition: A competency based measure where a person's abilities are measured in a situation that approximates a "real world" setting. Simulation is primarily used when it is impractical to observe a person performing a task in a real world situation (e.g., on the job).

Advantages:
- Better means of evaluating depth and breadth of student skill development than tests or other performance-based measures (internal validity).
- More flexible; some degree of simulation can be arranged for virtually any student target skill.
- For many skills, can be group administered, thus providing an excellent combination of quality and economy.

Disadvantages:
- For difficult skills, the higher the quality of simulation the greater the likelihood that it will suffer from same problems as “Performance Appraisals.”
  - Ratings of student performance is typically more subjective than standardized tests.
  - Sample of behavior observed or performance appraised may not be typical, especially because of the presence of others.
  - Usually requires considerable “frontloading” effort; i.e., planning and preparation.
- More expensive than traditional testing options in the short run.

Ways of Reducing Disadvantages:
- Reducing problems is relatively easy, since degree of simulation can be matched for maximum validity practicable for each situation.
- Can often be "standardized" through use of computer programs (and enhance external validity).

Bottom Lines:
An excellent means of increasing the external and internal validity of skills assessment at minimal long-term costs.
Performance Appraisals

Definition: A competency-based method whereby abilities are measured in most direct, real-world approach. Systematic measurement of overt demonstration of acquired skills.

Advantages:
- Provide a more direct measure of what has been learned (presumably in the program).
- Go beyond paper-and-pencil tests and most other assessment methods in measuring skills.
- Preferable to most other methods in measuring the application and generalization of learning to specific settings, situations, etc.
- Particularly relevant to the goals and objectives of professional training programs and disciplines with well defined skill development.

Disadvantages:
- Rating of student performance is typically more subjective than standardized tests.
- Requires considerable time and effort (especially front-loading), thus being costly.
- Sample of behavior observed or performance appraised may not be typical, especially because of the presence of observers.

Ways to Reduce Disadvantages:
- Develop specific, operational (measurable) criteria for observing and appraising performance.
- Provide training for observers/appraisers.
- Conduct pilot-testing in which rate of agreement (inter-rater reliability) between observers/appraisers is determined. Continue training and/or alter criteria for more specificity until acceptable consistency of measurement is obtained.
- Conduct observations/appraisals in the least intrusive manner possible (e.g., use of one-way observational mirrors, videotaping, etc.).
- Observe/appraise behavior in multiple situations and settings.
- Consider training and utilizing graduate students, upper level students, community volunteers, etc. as a means of reducing the cost and time demands on faculty.
- Cross-validate results with other measures, multiple methods should be used to validate the results of appraisals.

Bottom Lines:
Generally the most highly valued but costly form of student outcomes assessment. However, it is usually the most valid way to measure skill development.
External Examiner

Definition: Using an expert in the field from outside your program, usually from a similar program at another institution to conduct, evaluate, or supplement assessment of your students. Information can be obtained from external evaluators using many methods including surveys, interviews, etc.

Advantages:
- Increases impartiality, third party objectivity (external validity)
- Feedback useful for both student and program evaluation. With a knowledgeable examiner it provides an opportunity for a valuable program consultation.
- May serve to stimulate other collaborative efforts between departments/institutions.
- Incorporate external stakeholders and communities.
- Outsiders may disclose to an outsider what they might not otherwise share.
- Evaluators may have skills, knowledge, or resources not otherwise available.
- Useful in conducting goal-free evaluation (without prior expectations).

Disadvantages:
- Always some risk of a misfit between examiner’s expertise and/or expectations and program outcomes.
- For individualized evaluations and/or large programs, can be very costly and time consuming.
- Volunteers may become "donor weary."

Way to Reduce Disadvantages:
- Share program philosophy and objectives and agree on assessment criteria before the assessment.
- Form reciprocal external examiner “consortia” among similar programs to minimize costs, swapping external evaluations back and forth.
- Limit external examiner process to program areas where externality may be most helpful.

Bottom Lines:
Best used as a supplement to your own assessment methods to enhance external validity, but not as the primary assessment option. Other benefits can be accrued from the cross-fertilization that often results from using external examiners.
Oral Examination

(This method may be inconsistent with campus policies that prohibit the use of oral examinations.)

Definition: An assessment of student knowledge levels through a face-to-face dialogue between the student and examiner—usually faculty.

Advantages:
- Content and style can be geared to specific goals, objectives, and student characteristics of the institution, program, curriculum, etc.
- Specific criteria for performance can be established in relationship to course/curriculum.
- Process of development can lead to clarification/crystallization of what is important in the process/content of student learning.
- Local grading by faculty can provide immediate feedback related to material considered meaningful.
- Greater faculty/institutional control over interpretation and use of results.
- More direct implication of results for program improvements.
- Allows measurement of student achievement in considerably greater depth and breadth through follow-up questions, probes, encouragement of detailed clarifications, etc. (increased internal validity and formative evaluation of student abilities)
- Non-verbal (paralinguistic and visual) cues aid interpretation of student responses.
- Dialogue format decreases miscommunications and misunderstandings, in both questions and answers.
- Rapport-gaining techniques can reduce "test anxiety," helps focus and maintain maximum student attention and effort.
- Dramatically increases "formative evaluation" of student learning; i.e., clues as to how and why they reached their answers.
- Provides process evaluation of student thinking and speaking skills, along with knowledge content.

Disadvantages:
- Requires considerable leadership/coordination, especially during the various phases of development
- Can be difficult to document by note-taking and providing student feedback with a grade.
- Costly in terms of time and effort (more "frontload" effort for objective; more "backload" effort for subjective)
- Demands expertise in measurement to assure validity/reliability/utility
- May not provide for externality (degree of objectivity associated with review, comparisons, etc. external to the program or institution).
- Requires considerably more faculty time, since oral exams must be conducted one-to-one, or with very small groups of students at most.
- Can be inhibiting on student responsiveness due to intimidation, face-to-face pressures, oral (versus written) mode, etc. (May have similar effects on some faculty!)
- Inconsistencies of administration and probing across students reduce standardization and generalizability of results (potentially lower external validity).

Ways to Reduce Disadvantages:
- Prearrange "standard" questions, most common follow-up probes, and how to deal with typical students' problem responses; "pilot" training simulations.
- Take time to establish open, non-threatening atmosphere for testing.
- Electronically record oral exams for more detailed evaluation later.
Bottom Lines:
Oral exams can provide excellent results, but usually only with significant – perhaps prohibitive – additional cost. Definitely worth utilizing in programs with small numbers of students, and for the highest priority objectives in any program and local testing policies do not prohibit the testing method.
Behavioral Observations

Definition: Measuring the frequency, duration, topology, etc. of student actions, usually in a natural setting with non-interactive methods. For example, formal or informal observations of a classroom. Observations are most often made by an individual and can be augmented by audio or videotape.

Advantages:
- Best way to evaluate degree to which attitudes, values, etc. are really put into action
- Catching students being themselves is the most "natural" form of assessment
- Least intrusive assessment option, since purpose is to avoid any interference with typical student activities.

Disadvantages:
- Always some risk of confounded results due to "observer effect;" (i.e., subjects may behave atypically if they know they're being observed.)
- Depending on the purpose of the data gathering, there may be socially or professionally sensitive issues to be dealt with (e.g., invasion of privacy on student political activities or living arrangements) or even legal considerations (e.g., substance abuse or campus crime).
- May encourage "Big Brother" perception of assessment and/or institution.
- Inexperienced or inefficient observers can produce unreliable, invalid results.

Ways to Reduce Disadvantages:
- Avoid using this method when studying socially or ethically sensitive issues.
- Include representative student input in process of determining "sensitivity" of issue.
- Utilize electronic "observers" (i.e., audio and video recorders) wherever possible, for highly accurate, reliable, permanent observation record (although this may increase assessment cost in the short run if equipment is not already available.)
- Strictly adhere to ethical guidelines for the protection of human research subjects.

Bottom Lines:
This is the best way to know what students actually do, how they manifest their motives, attitudes and values. Special care and planning are required when studying sensitive issues, but in situations where the information derived from the observations is critical, it's usually worth it for highly valid, useful results.
Establishing Timelines and Responsibilities
-An Example-

In program assessment planning, it is important to let common sense prevail. You can’t do everything. Processes must be established that capitalize on what is already being done and complement the work of the faculty. Decisions will need to be made. Just as faculty cannot teach the universe of all concepts and skills related to a single course, programs cannot assess everything that they believe students should know or be able to do. As decisions are made and as assessment and evaluation process are developed, think systematically and for the long term. Identify where you want to be at some time in the future and work backwards.

The timeline illustrated in Table 1 demonstrates a three year cycle where each outcome is assessed every three years. Because there are only six outcomes, this means that the data collection process takes place on only two outcomes per year. The timeline provides for two cycles of data collection every six years.

<table>
<thead>
<tr>
<th>Learning Outcomes (each with measurable performance criteria):</th>
<th>'04-5</th>
<th>'05-6</th>
<th>'06-7</th>
<th>'07-8</th>
<th>'08-9</th>
<th>'09-10</th>
</tr>
</thead>
<tbody>
<tr>
<td>A recognition of ethical and professional responsibilities</td>
<td></td>
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<td></td>
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<tr>
<td>An understanding of how contemporary issues shape and are shaped by mathematics, science, &amp; engineering</td>
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<td>An ability to recognize the role of professionals in the global society</td>
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<tr>
<td>An understanding of diverse cultural and humanistic traditions</td>
<td></td>
<td>•</td>
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</tr>
<tr>
<td>An ability to work effectively in teams</td>
<td>•</td>
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<td>•</td>
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</tr>
<tr>
<td>An ability to communicate effectively in oral, written, graphical, and visual forms</td>
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</tbody>
</table>

Table 1. Data collection cycle for six learning outcomes

The table above can be misleading in that during the year where data collection is taking place on some of the outcomes, activities are taking place related to other outcomes. Table 2 below represents an assessment and evaluation timeline for multiple processes for a single outcome.

From Assessment Planning Flow Chart©2004, Gloria M. Rogers, Ph.D., ABET, Inc. (gragers@abet.org) Copyright 2005
Outcome: An ability to recognize the role of professionals in the global society

<table>
<thead>
<tr>
<th>Assessment and Evaluation Activity</th>
<th>'04-5</th>
<th>'05-6</th>
<th>'06-7</th>
<th>'07-8</th>
<th>'08-9</th>
<th>'09-10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review of performance criteria that define the outcome</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Map educational strategies related to performance criteria</td>
<td></td>
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</tr>
<tr>
<td>Review mapping and identify where data will be collected</td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Develop and/or review assessment methods used to assess performance criteria</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Collect data</td>
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<tr>
<td>Evaluate assessment data including processes</td>
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<tr>
<td>Report findings</td>
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<tr>
<td>Take action where necessary</td>
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</tbody>
</table>

Table 2. Assessment and evaluation activity timeline for a single outcome

To get a general view of what one cycle of an assessment program might look like, Table 3 represents three academic years of activity for six learning outcomes by assessment and evaluation activities.

<table>
<thead>
<tr>
<th>Activities</th>
<th>'04-5</th>
<th>'05-6</th>
<th>'06-7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review of performance criteria defining that outcome</td>
<td></td>
<td></td>
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<tr>
<td>Map educational strategies related to performance criteria</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Review mapping and identify where data will be collected</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Develop or review assessment methods related to outcome</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Collect and analyze data</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evaluate assessment data including processes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Report findings</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Take action where necessary</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3. Three-year cycle of assessment and evaluation activity

From Assessment Planning Flow Chart©2004, Gloria M. Rogers, Ph.D., ABET, Inc. (grogers@abet.org) Copyright 2005
Although this appears to require considerable effort, not all assessment activities need to be done by the same person or group. Table 4 suggests that there are multiple parties involved in the assessment and evaluation cycle. It is important to plan strategically and systematically so that the workload is reasonable and appropriately distributed.

<table>
<thead>
<tr>
<th>Assessment and Evaluation Activity</th>
<th>Responsibility for activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review of performance criteria that define the outcome</td>
<td>Faculty Assessment Team</td>
</tr>
<tr>
<td>Map educational strategies related to performance criteria</td>
<td>All Faculty</td>
</tr>
<tr>
<td>Review mapping and identify where data will be collected</td>
<td>Program Faculty</td>
</tr>
<tr>
<td>Develop and/or review assessment methods used to assess performance criteria</td>
<td>Faculty Assessment Team w/Assessment Resource</td>
</tr>
<tr>
<td>Collect and analyze data</td>
<td>Faculty Assessment Team w/Assessment Resource</td>
</tr>
<tr>
<td>Evaluate assessment data including processes</td>
<td>Program Faculty</td>
</tr>
<tr>
<td>Report findings</td>
<td>Program Faculty</td>
</tr>
<tr>
<td>Take action where necessary</td>
<td>Program Faculty</td>
</tr>
</tbody>
</table>

Table 4. Parties responsible for the assessment and evaluation processes

These tables are for illustrative purposes only. In order to close the loop on the assessment and evaluation process, it is important to plan with the end in mind. Creating a multi-year timeline will help to shape thinking about the activities involved in program assessment. It will also help to avoid taking on too much in the beginning and encourage systematic planning over time.

Creating these types of tables should only be seen as tools to assist in administering and communicating the process. At any time it is found that the processes need to be altered, the information in the tables should change. For example, it may be found after multiple data collection and analysis processes that one or more of the outcomes are consistently of high quality whereas there are other outcomes where the program cannot demonstrate adequate achievement. This could lead to more frequent data collection and evaluation process for some outcomes and less for others. The overall process needs to be designed to answer questions that are of interest to the program. "Systematic" does not mean "etched in stone." If you need to change your processes and/or cycles of activity, then it should be done.

From Assessment Planning Flow Chart©2004, Gloria M. Rogers, Ph.D., ABET, Inc. (gragers@abet.org) Copyright 2005
# Program Learning Outcomes

Learning Outcome: __________________________

(To see completed example, click here.)

<table>
<thead>
<tr>
<th>Performance Criteria</th>
<th>Strategies</th>
<th>Assessment Method(s)</th>
<th>Context for Assessment</th>
<th>Time of data collection</th>
<th>Assessment Coordinator</th>
<th>Evaluation of Results</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>

Results: ____________ (date):

Actions: ____________ (date):

Second-Cycle Results: ____________ (date):
**Glossary of Terms:** (Return to Form)

**Learning Outcome:** Knowledge, skill, attitudes, values, etc. that students should be able to demonstrate by the end of the program.

**Performance criteria:** Performance criteria are measurable and indicate the specific characteristics students should exhibit in order to demonstrate desired achievement of the learning outcomes. The expected performance should be specified by name, using an observable action verb which defines the level of learning expected (e.g. list, interpret, discriminate, or define).

**Strategies:** The courses or activities that are designed to provide opportunities for students to learn, practice, and/or demonstrate the performance criteria. This identifies how the curriculum is aligned with the projected outcome. For program assessment, **required** courses are generally listed.

**Assessment Method:** The assessment tool(s) that will be used to assess student learning.

**Context for assessment:** The course or other setting in which the assessment data will be collected. For program assessment it is not necessary—or even desirable—to analyze data from every course or setting in which the learning outcome is addressed, nor are data needed from every student. Sampling strategies can be used where appropriate.

**Time of data collection:** Identifies when the assessment data will be collected.

**Assessment Coordinator:** The person responsible for collecting the assessment data.

**Evaluation of Results:** The person/group responsible for determining the meaning of the assessment results and making recommendations for action.

**Results:** The outcome from data collection and analysis.

**Actions:** Based on the findings, the actions taken which have been recommended to improve student performance.

**Second-Cycle Results:** The outcome based on assessment and evaluation after taking action on earlier data collection and analysis.

(Return to Form)
Program
Learning Outcome: Students can work effectively in teams

<table>
<thead>
<tr>
<th>Performance Criteria</th>
<th>Strategies (ME113, EM213, ME213, ME235, ME333, ME412)</th>
<th>Assessment Method(s)</th>
<th>Source of Assessment</th>
<th>Time of data collection</th>
<th>Assessment Coordinator</th>
<th>Evaluation of Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Produces research information for the team</td>
<td>ME113, EM213, ME213, ME235, ME333, ME412</td>
<td>Peer Evaluations, Faculty Evaluations</td>
<td>ME 213</td>
<td>ME 213 Even ME412 Odd</td>
<td>Even – Armaly Odd - Richards</td>
<td>Department Curriculum Committee</td>
</tr>
<tr>
<td>2. Demonstrates understanding of team roles when assigned</td>
<td>ME113, EM213, ME213, ME235, ME333, ME412</td>
<td>Peer Evaluations, Faculty Evaluations</td>
<td>ME 213</td>
<td>ME 213 Even ME412 Odd</td>
<td>Even – Armaly Odd - Richards</td>
<td>Department Curriculum Committee</td>
</tr>
<tr>
<td>3. Shares in the work of the team</td>
<td>ME113, EM213, ME213, ME235, ME333, ME412</td>
<td>Peer Evaluations, Faculty Evaluations</td>
<td>ME 213</td>
<td>ME 213 Even ME412 Odd</td>
<td>Even – Armaly Odd - Richards</td>
<td>Department Curriculum Committee</td>
</tr>
<tr>
<td>4. Demonstrates good listening skills</td>
<td>ME113, EM213, ME213, ME235, ME333, ME412</td>
<td>Peer Evaluations, Faculty Evaluations</td>
<td>ME 213</td>
<td>ME 213 Even ME412 Odd</td>
<td>Even – Armaly Odd - Richards</td>
<td>Department Curriculum Committee</td>
</tr>
</tbody>
</table>

Results 2003: A sample of 56 students (52% of 2005 cohort) were assessed. This represents 2 of 4 sections of ME412 which is the second semester of a two-semester team experience.) The percent of the sample that demonstrated each criterion were as follows: Criterion 1 - 72%; Criterion 2 - 65%; Criterion 3 - 62%; Criterion 4 - 89%

Actions 2004-05: Based on the analysis of the results, data will also be collected in ME213 to identify issues prior to the capstone experience. The department asked faculty to provide the teaming evaluation rubrics to students with the course assignments where the students were provided opportunities to demonstrate their teaming skills as defined by the criteria. A sub-committee of the department Curriculum Committee met to review the performance criteria. It was decided not to make any changes in the criteria at this time. Faculty decided that they would review their assignments to be sure that students were given adequate opportunities to demonstrate the performance identified for teaming. Faculty also agreed to make students performance on the criteria a part of their grade for the activity where appropriate. The Teaching/Learning Center will also provide a seminar for faculty on how to integrate effective teaming into the classroom.

Second-Cycle Results: Results from the ME213 assessment (sample of two sections—64 students or 49% of cohort) demonstrated that they were making progress toward achievement of the criteria: Criterion 1-43%; Criterion 2—47%; Criterion 3—53%; Criterion 4—52%. A sample of 59 students (51% of cohort) were assessed in ME 412. This represents 2 of 4 sections of ME 412 which is the second semester of a two-semester team experience. Based on changes made, the following improvements were seen: Criterion 1 - +12% (84%); Criterion 2 - +7% (72%); Criterion 3 - +13% (75%); Criterion 4 - +2% (91%).

Actions 2006-07: Although progress was made on all criteria, the Curriculum Committee recommended that the Department take another look at all the performance criteria related to teaming. The Teaching/Learning Center was asked to provide the Department some feedback on the criteria and also provide other examples of teaming performance criteria. This will be one of the issues that will be discussed at the Department retreat for possible revisions for the 2007 academic year.

Can't do on her website
Designing Assessment for Impact

Participants in the March 6, 2002 GE Embedded Assessment Conference were invited to brainstorm ideas for designing assessments that are likely to have an impact on the learning environment. This is a brief summary of our conversation.

Faculty Involvement
Faculty are more likely to respond to assessments in constructive ways if they have been engaged in the assessment process. Faculty should be involved in:
- Determining the learning objectives to be assessed
- Examining the alignment of the curriculum with those learning objectives
- Integrating the learning objectives into their syllabi and courses
- Designing assessment studies
- Determining the implications of the findings

Engaging Faculty
Faculty engagement in the assessment process is crucial. Among the ideas for encouraging faculty engagement were:
- Feed them (welcome them into the assessment process and reward their participation).
- Provide time (this is a precious commodity for our busy faculty).
- Reward, recognize, and celebrate assessment efforts (including recognition of this work in RPT and public forums).
- Use the “infection model” - involve key faculty in assessment and let them “infect” their colleagues with the assessment “bug.”
- Be sure that faculty who are new to assessment experience early successes so they can see the value of assessment and don’t become discouraged with the process.
- Be patient and persistent. Quality assessment takes time.
- Use existing data when you can, eliminating or reducing the data collection phase of assessment projects. This could be accomplished through embedding assessment within course activities, assignments, and exams.
- Provide support to programs and faculty who have identified needs through their assessments, such as lab assistants or faculty development in how to help students learn to improve speaking or writing skills.

Engaging Students
Students can benefit from engaging in assessment as:
- Data collectors (e.g., interviewers, focus group facilitators)
- Feedback providers (e.g., through surveys, interviews, focus groups)
- Data providers (e.g., through portfolios, classwork collected through embedded assessment)
- Self assessors (e.g., students could be asked to analyze, reflect on, and revise an early writing sample)

Rubrics
Rubrics are commonly used in assessment. Rubrics could be more useful if:
- They are pilot tested in actual classes before being used by assessment panels.
- Faculty are normed on their use, so they are applying them in a uniform way.
Using Course or Test Grades for Program Assessment

When discussing outcomes assessment, one of the most common questions that faculty members have is, "We are already giving students grades in courses. Why can't we just use grades as a measure of student learning outcomes?"

Grades represent the extent to which a student has successfully met an individual faculty member's requirements and expectations for a unit or course. Because many factors contribute to an assigned grade, it is almost impossible to make inferences about what a student knows or can do solely by looking at that grade.

In outcomes assessment at the program level, the primary question that needs to be answered is, to what extent do students demonstrate the anticipated learning outcomes? The focus of program assessment is on providing evidence that students can demonstrate knowledge or a skill that is directly linked to specific performance criteria that define the program outcomes. Grades per se are relative measures and generally do not represent specific aspects of learning. More often, they reflect performance on multiple concepts.

Course content and emphasis vary with each individual faculty member's beliefs about what is important (topics, concepts, and levels of cognition students must demonstrate for each concept) and the faculty member's expertise and interests. The grading policy in any course is dependent on the individual faculty member. This is generally true even when there are multiple sections of the same course with common exams and syllabi.

Some faculty choose to give (or take away) 'points' or award 'partial credit' for things that are not related to student learning (e.g., attendance, class participation, and filling out the course evaluation). Some faculty grade on a curve, while others have a fixed standard. Letter grades or numeric scores reflect the relative standing the student has in the class or on a test—relative to a set scale or relative to other students. All of these variables confound the ability to interpret the meaning of the grade related to specific student knowledge or abilities. An assigned grade does not tell the person interpreting it what a student knows or can do, nor does it provide information about which topics or concepts a student did not understand or how student learning could be improved.

For program assessment, a numeric score that is directly linked to students' performance on specific performance criteria can be used as evidence of program learning outcomes. For example, for the outcome "students have an understanding of ethical responsibility," one of the performance criteria could be "students will demonstrate the ability to evaluate the ethical dimensions of a problem in their discipline."

Faculty could develop a rubric to score student performance. Each performance level is described and assigned a numeric score (e.g., 1=poor, 2=developing, 3=good, and 4=exemplary). The student work related to the specific performance can be scored as a part of the course work and may also contribute to the course grade. Reporting the percent of students who score at each of the performance levels provides meaningful data that are linked directly to the anticipated performance and focus the evaluation and strategies for improvement.

Grades will continue to be an important part of the higher education culture and should be understood for what they represent. However, the measure used to assess the outcomes should be used consistently among faculty, reflect specific student knowledge or skills, and be directly linked to specific performance criteria. It is important to remember that the focus is not a score but the specific student knowledge or skill that the score represents.

Modified from "Do Grades Make the Grade in Program Assessment," ABET Communications Link, Spring 2003.
| Stakeholder Involvement (Those who have a vested interest in the outcome of the program) | RATING | Program Educational Objectives (Graduates performance after completing program) | RATING | Program Outcomes (Desired knowledge, skills, attitudes, behaviors, by the time of completing program) | RATING | Program Outcomes aligned with educational practices | RATING | Assessment Processes | RATING | Evaluation | RATING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Stakeholders are identified | | Objectives are defined | | Outcomes are Identified | | Desired outcomes and are mapped to curricular practices and/or strategies (e.g., courses/ teaching methodology) | | Assessment is on-going and systematic at the program level | | Assessment data are systematically reviewed | | |
| Primary stakeholders are involved in identifying/affirming program educational objectives | | Objectives are publicly documented | | Number of outcomes are manageable | | Practices/strategies are systematically evaluated using outcomes assessment data | | Multiple methods are used to measure each outcome | | Evaluation of results are done by those who can affect change | | |
| Primary stakeholders are involved in periodic evaluation of educational objectives | | Number of objectives are manageable | | Outcomes are publicly documented | | Where necessary, educational practices are modified based on evaluation of assessment data | | Both direct and indirect measures of student learning are used to measure outcomes | | Evaluation of assessment data is linked to curricular practices/strategies | | |
| Sustained partnerships with stakeholders are developed | | Objectives are aligned with department/program mission statement | | Outcomes are linked to educational objectives | | Assessment processes are reviewed for effectiveness and efficiency | | Evaluation leads to decision making/action | | | | |
| Objectives are periodically assessed to determine achievement | | Objectives are periodically evaluated for currency | | Outcomes are defined by a manageable number of measurable performance indicators | | When needed, assessment methods are modified based on evaluation processes | | | | | |

1 This tool is intended for self-assessment only to assist in understanding areas for improvement in the assessment process development. Assessment Planning Flowchart © 2004 Revised January 2008.
Assessment for Quality Assurance

Program Educational Objectives

Mission

Program Outcomes

Assess/Evaluate

Constituents/Stakeholders

Feedback for Continuous Improvement

Measurable Performance Criteria (Indicators)

Educational Practices/Strategies

Evaluation: Interpretation of Evidence

Assessment: Collection, Analysis of Evidence

Rubrics

Keep the process simple and prioritize them (Top 4?)

Who are you what you do for who you serve

It may take a full looecy to work out kinks.
Program Learning Outcomes

Learning Outcome

(To see completed example, click here.)

<table>
<thead>
<tr>
<th>Performance Criteria</th>
<th>Strategies</th>
<th>Assessment Method(s)</th>
<th>Context for Assessment</th>
<th>Time of data collection</th>
<th>Assessment Coordinator</th>
<th>Evaluation of Results</th>
</tr>
</thead>
<tbody>
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Results _______________ (date):

Actions _______________ (date):

Second-Cycle Results _______________ (date):
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Return to Form
**Learning Outcome:** Students can work effectively in teams.

### Performance Criteria

<table>
<thead>
<tr>
<th>Performance Criteria</th>
<th>Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Produces research</td>
<td>Assessment methods (source of assessment, time of data collection, source of evidence), Team meeting minutes, Project reports</td>
</tr>
<tr>
<td>2. Demonstrates leadership</td>
<td>Faculty evaluations, Peer evaluations, ME 413, ME 421, ME 423, ME 313, ME 321, ME 323</td>
</tr>
<tr>
<td>3. Shares the work of the team when assigned</td>
<td>Faculty evaluations, Peer evaluations, ME 413, ME 421, ME 423, ME 313, ME 321, ME 323</td>
</tr>
<tr>
<td>4. Demonstrates good team</td>
<td>Faculty evaluations, Peer evaluations, ME 413, ME 421, ME 423, ME 313, ME 321, ME 323</td>
</tr>
</tbody>
</table>

### Second-Cycle Results (2005):

- Results from ME 213 assessment (sample of 65 students) - 52% of 2005 cohort (65% of 2005 cohort): 62% of course was made. The ME 213 assessment was conducted in 1985, and the ME 213 assessment was conducted in 1984.
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### Actions 2000-01:

- Although progress was made on all criteria, the curriculum committee recommended that the department take another look at all the course materials.

### Actions 2000-01:

- Based on changes made, the following improvements were seen: Course 1 - 12% of the course (20% of 2005 cohort) was assessed. This represents 2 of 4 sections of ME 412 which is the second semester of a two-semester team experience. The computing team submitted a proposal for a seminar on teaching and learning. The team was also provided a seminar on teaching and learning. The team was also provided a seminar on teaching and learning.

### Second-Cycle Results (2005):

- Results from ME 213 assessment (sample of 65 students) - 52% of 2005 cohort (65% of 2005 cohort): 62% of course was made. The ME 213 assessment was conducted in 1985, and the ME 213 assessment was conducted in 1984.

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