Achieving Student Learning Outcomes
December 2011

Annual Undergraduate Assessment Reports

Thank you to the following undergraduate degree-granting programs for submitting an annual undergraduate assessment report. The assessment committee is currently in the process of reviewing the reports, writing responses, and developing strategies for supporting faculty members’ efforts to engage in ongoing student learning outcome assessment.

Chemical Engineering          Geology and Geological Engineering
Chemical and Biochemical Engineering  Math and Computer Science
Chemistry and Geochemistry     Metallurgical and Materials Engineering
Economics and Business        Mining Engineering
Engineering                    Petroleum Engineering
Engineering Physics

Classroom Assessment Technique (CAT): Defining Issues Matrix

Classroom assessment techniques (CATs) are tools for assessing student learning. CATs provide faculty with insights regarding how much, how well, and how students are learning what faculty are trying to teach.

A defining features matrix requires students to distinguish between related or seemingly similar concepts. To implement this CAT, develop a matrix of three columns and several rows. At the top of two columns, list two distinct concepts that have potentially confusing similarities. In another column, list the important characteristics of the concepts, in no particular order. Have students identify which characteristics belong to each of the two concepts. Collect students’ responses and you will quickly be able to determine which characteristics are most confusing to your students. A simple example of this CAT is below.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Rocks formed by . . .</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>contact metamorphism</td>
</tr>
<tr>
<td>Formed at temperatures above 200 C</td>
<td></td>
</tr>
<tr>
<td>May originally have been an igneous rock</td>
<td></td>
</tr>
<tr>
<td>Form as a result of increasing pressures</td>
<td></td>
</tr>
<tr>
<td>May surround plutonic igneous rocks</td>
<td></td>
</tr>
<tr>
<td>Slate is an example</td>
<td></td>
</tr>
<tr>
<td>Form as a result of melting</td>
<td></td>
</tr>
</tbody>
</table>

Source: http://www.uakron.edu/centers/cc/docs/CAT_defmatrix.pdf
Examples of Best Practices: Rose-Hulman Institute of Technology

Rose-Hulman was a 2007 recipient of the Council for Higher Education Accreditation award for institutional progress in student learning outcomes. This award acknowledged Rose-Hulman’s development of the RosE Portfolio, which is an online, digital system designed to allow students, faculty, and administrators to archive, assess, and evaluate student work for the purpose of class, department, program, and institutional assessment. In addition, the RosE Portfolio offers features like the showcase resume, the curriculum map, and customizable assessment outlines.

At RHIT, student learning outcomes are organized into three domains: professional skills, world citizenship, and technical knowledge. Technical knowledge is the core of the Rose-Hulman education. Outcomes in this domain are determined by each academic department for discipline-appropriate knowledge, problem definition and solving skills, and analysis and synthesis skills. Outcomes, performance criteria, and rubrics related to these outcomes are online at http://www.rose-hulman.edu/offices-services/institutional-research,-planning-and-assessment/caso.aspx.

Dr. Gloria Rogers, formerly of Rose-Hulman and ABET, describes the assessment process used by RHIT as follows:

Step 1. Identify goals of the department. (What is to be achieved?)
Step 2. Identify specific objectives for each broad goal.
Step 3. Develop performance criteria for each objective. (What will students be able to do, or be, or possess when the goals are accomplished?) This includes setting desired levels of performance to be used in Step 6.
Step 4. Determine the practices to be used to achieve the goals. (What will be done to achieve the goals and objectives?)
Step 5. Select assessment methods for each objective (choose data collection methods.)
Step 6. Conduct assessments. Gather and analyze data and compare against performance criteria.
Step 7. Determine feedback channels which provide information in a timely fashion to facilitate continuous improvement of the practices, to provide information for decision making, and to provide basis for comparing achievement to expectations.
Step 8. Evaluate whether or not the performance criteria were met and the objectives were achieved.

Resources Available on the Assessment Website

The Mines assessment website is at http://inside.mines.edu/assessment. Resources include:

- ABET policy and procedure manuals, accreditation criteria, etc.
- Descriptions of classroom assessment techniques
- Samples of other institutions’ assessment plans
- Sample rubrics
- Bloom’s taxonomy of action verbs
- A summary of our HLC Quality Initiative
- A list of characteristics of a strong assessment plan
- The assessment FAQ

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