

Course-based Assessment Overview

Using Student Work From Courses To Assess Program-Level Student Learning Outcomes

Definition:

- Course-based assessment, sometimes called embedded assessment or authentic assessment, is based on identifying and acquiring student work within specific courses that best relates to specific program-level student learning outcomes. The faculty or staff can use existing information that is routinely collect (test performance, papers, verbal reports) or introduce specific student assignments/work into a course specifically for the purpose of measuring student learning.

First, determine if using course-based student work is the best choice for data collection:

- Is the student work easily obtained?
- Do you know how you will assess the student work? (e.g., use of scores on test questions, ratings or rubrics judging quality of papers, reports, projects) Is the method of assessment (e.g., rubric) clearly connected to the program's learning outcome(s)?
- Do you know who will evaluate the student work? How easy will that process be? How much time and cost is involved in having the work assessed?
- Is the students' work (e.g. assignment, test, portfolio, etc) clearly connected to the program's learning outcome(s)? Do the faculty or members of the program agree that this assignment is connected to the outcome(s)?
- Are the faculty (or members of the program) in the courses/events from which the student work is obtained, willing to share info about their students' work and assessment findings with other faculty members?
- Will the results of the assessment allow the faculty (or members of the program) to know where and what improvements/enhancement to make for the program?
- Is this a high-stakes test? If yes, it may produce student anxiety that may result in assessment reflecting lesser ability than actual ability.

Next, consider your sample:

What student work will you use?

- Student works selected from the curriculum (in various courses or events) are the best ways to get direct measure of whether the students have met an outcome.
- The work should be related to the curriculum, the courses, and the program's outcomes.
- The work and assessment methods should inform the program about how well the students know the concepts covered in the outcome, what they think about a concept covered in the outcome and/or how they perform on a specific task.
- See "worksheets" for specific methods and analyses techniques including TESTS, Rubrics, Content Analysis

How Many

- The use of the student work for assessment is for program improvement and not for scientific research of effects on student learning. Therefore, if the number of students in the course, from which the work is used, is between 25-100, then use the entire student population for that course. If the course has multiple sections, take a sample from the various sections to equal between 50-100.

- For statistical confidence and uses for generalization, then calculate the exact sample size needed with a sample size calculator (sample size calculator: <http://www.researchinfo.com/docs/calculators/samplesize.cfm>)
- “How many different assignments, homework, reports and tests from the course do I need to collect?” Consider this *Principle of Good Practice for Assessing Student Learning*: “Assessment makes a difference when it begins with issues of use and illuminates questions that people really care about.” You need enough information to be able to address your questions/outcomes.

How to design course-based assessment:

- One way to determine which student work products to use is to consider which courses/events relate to the program outcomes. Map program outcomes to courses or events.
- The faculty who teach the specific courses that map to specific outcomes can be asked to identify student work. That faculty member lists the various assignments, tests, projects related to the program outcome(s).
- If there are several courses that cover one outcome and/or several courses assignments, the faculty need to determine which of these courses and assignments/student work will be best to use for that program outcome. One way to decide is to participate in a faculty retreat where all faculty agree which course and which course assignments will be used.
- After the entire faculty membership for the program has come to consensus on which assignments to use, the next step is to develop a complete list of course-based methods for all the outcomes and who is responsible for each assessment. Remember to consider the overall program’s timeline for assessment. It may not be necessary to collect course-based assessment in every course, every semester, or even every year.
- Once the exact assignment/student work has been identified, the faculty member may provide the scoring of that work. Best practices show that a team of faculty who examine the work can provide less biased judgment.
- The faculty members responsible for the identified course-based assessment data should also know who and how to transmit the assessment work and results to the appropriate people, such as assessment professionals, program’s assessment committee or curriculum committee

Course-based assessment examples:

- Final test in a course that has 5 questions related to the program outcome.
- Lab reports are examined by a group of faculty to determine how well student can write lab reports (using a rubric).
- Outside experts are invited into a classroom and given a grading scheme as they listen to student presentations. Experts can judge content, oral skills, presentation style.
- Students rate each other using a team work survey – can be used to see where most student have difficulty.
- Specific analysis problems solved, including “open-ended” application of assumptions
- Graded design projects in introduction, junior, or senior courses
- Rubrics used to score essays from specific courses

Data analysis:

- Analysis is based on the group of students, not on individual student performance.
- See “worksheets” for specific techniques for Content Analysis; qualitative analysis, quantitative analyses

Tips to Ensure Quality:

- In general, students take embedded course work seriously; therefore work has a good chance of reflecting actual abilities.
- Multiple faculty (not just the faculty member teaching the course) should make judgments about the fit of the student work to the program-level outcome and to judge the quality of the student work based on well-developed guidelines, rubrics, etc.
- Shared rubrics, shared test items, etc can be used across the program. (e.g. rubric on critical thinking or rubric on lab reports)

References and Additional Information:

- Estell, J. (2004, February). *The faculty course assessment report*. Proceedings of the Best Assessment Processes VI Symposium, Rose-Hulman Institute of Technology, Terre Haute, IN.
- Palomba, C. A., & Banta, T. W. (1999). *Assessment essentials: Planning, implementing, improving*. San Francisco: Jossey-Bass.
- Spurlin, J., Rajala, S., & Lavelle, J. (2008) (eds.) *Designing Better Engineering Education Through Assessment: A Practical Resource for Faculty and Department Chairs on Using Assessment and ABET Criteria to Improve Student Learning*. Sterling, Va: Stylus Publishing.
- Stassen, M.L.A., Doherty, K., & Poe, M. (2001). Course-based review and assessment methods for understanding student learning. University of Massachusetts Amherst.
- Sudman, Seymour. 1976. *Applied sampling*. New York: Academic Press.
- Suskie, L. (2004). *Assessing student learning: A common sense guide*. Bolton: Anker.

Team Worksheet to Determine Course-Based Assessment Methodology¹

(Team consists of faculty members who teach the courses identified as strongly related to this outcome in the curriculum/outcome matrix.)

Program Outcome Number: _____

Briefly paraphrase the Program Outcome: _____

Step 1: For each course identified under this outcome (see curriculum/outcome matrix), come to consensus on 1–3 course outcomes that best match the program outcome.

Step 2: Determine how to assess each of these 1–3 course outcomes in order to give a complete assessment of the program outcome (Team should come to a consensus on the method, with agreement by the faculty member who teaches the course or is in charge of the course).

Course #	Paraphrase course outcome here	Assessment Method: Be as specific as possible	Assessment Process: Who will collect assessment, who will process assessment, and where will data be kept?	Assessment Standard: How will the faculty know if the outcome has been met?	Can this data be used for another program outcome? If so, which one?

¹ Team Worksheet Copyrighted: Spurlin, J. (2008). Assessment methods used in undergraduate program assessment. In J. Spurlin, S. Rajala, & J. Lavelle (eds.) *Designing Better Engineering Education Through Assessment: A Practical Resource for Faculty and Department Chairs on Using Assessment and ABET Criteria to Improve Student Learning*. Sterling, Va: Stylus Publishing.

Program Outcome Number: 3c

Briefly paraphrase the Program Outcome: To demonstrate that graduates have an ability to design a system, component or process to meet desired needs

Course #	Paraphrase course outcome here	Assessment Method: Be as specific as possible	Assessment Process: Who will collect assessment, who will process assessment, and where will data be kept?	Assessment Standard: How will the faculty know if the outcome has been met?	Can this data be used for another program outcome? If so, which one?
CIL 361	Integrate basic science and engineering knowledge to effectively solve technical problems	Test 3 will cover this outcome; 5 topics will be covered with 3 or more questions on each topic; 3 topics will involve solving technical problems with 2 topics dealing with basic science and engineering knowledge.	Test given in class and score for each question by individual students will be kept for database by [name]. Data will be summarized to note the number of students who get questions correct on each topic.	Excellent: 86% or more of the students get 2 or more questions correct on specific topic Average: 70–85% of students get 2 or 3 questions correct on topic Poor: fewer than 70% of students get 2 or 3 questions correct on topic Outcome met if 4 out of 5 topics have at least an “average”	No

Assessment Methodology for Program Outcome: 3c

Briefly paraphrase the Program Outcome: To demonstrate that graduates have an ability to design a system, component, or process to meet desired needs

Course #	Paraphrase course outcome here	Assessment Method: Be as specific as possible	Assessment Process: Who will collect assessment, who will process assessment, and where will data be kept?	Assessment Standard: How will the faculty know if the outcome has been met?	Can this data be used for another program outcome? If so, which one?
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<p>CIL 451</p>	<p>2. Define the design project 5. Identify possible solutions to a design problem 7. Communicate the design project</p>	<p>Oral presentation of capstone project Use of rubric to judge each part of the design process as well as oral communication</p>	<p>Step 1: Faculty team to define the rubric to be used Step 2: Faculty make and keep videotapes of oral presentations of capstone project Step 3: Review of videotapes by panel of four reviewers each January and May Step 4: Keep spreadsheet of rubric scores on database</p>	<p>Each topic on rubric will be met by at least 85% of the students.</p>	<p>3.g—oral communication</p>
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