

Topic: Appropriate Measures for Student Learning Outcomes vs. Program Outcomes

Introduction

Of an academic program's 5 to 8 student learning and 2 to 3 program outcomes, each academic program at Virginia Tech should measure and report findings for 2 to 3 student learning outcomes and 1 to 2 program outcomes on an annual basis. Each outcome should be measured at least twice within a 5-year period. Programs may use a variety of measures to assess their outcomes. However, all outcomes must have at least one direct measure.

Appropriate Measures for Student Learning Outcomes

There are two different types of assessment measures: direct and indirect. **Direct measures** enable faculty members or other reviewers to directly evaluate student work that demonstrates the specific knowledge, skill, ability, or competency described in a student learning outcome. Some examples of direct measures are specific pieces of student work such as papers, presentations, capstone projects, portfolios, case studies, lab reports, externally reviewed performances or projects, exams developed by course instructors, and commercially-developed tests, all of which are examined at the level of a specific student learning outcome (not an overall project/test score).

When measuring student learning outcomes, faculty members or other reviewers should assess ***the extent to which*** a particular outcome has been achieved. For example, if the primary measure being used by a MS program to assess a student's written communication skills is a master's thesis, then the thesis needs to be assessed for ***the extent to which*** the student has demonstrated effective written communication skills. The thesis would be assessed with a rubric or other criterion that evaluates student performance in regards to written communication. Simply tracking whether or not a student completed a thesis (or any other piece of student work or program-related task) is not a direct measure of a student learning outcome.

In contrast, **indirect measures** of student learning outcomes are not directly observable. These measures typically ask students to reflect on their learning or abilities but do not provide direct evidence of the learning. Instead, students' knowledge, skills, abilities, or competencies are inferred from students' responses. Examples of indirect measures of student learning outcomes are student surveys, exit interviews, course evaluations, employer satisfaction surveys, and focus groups. Programs may use a mix of direct and indirect measures for student learning outcomes as long as there is at least one direct measure for each student learning outcome.

About using grades as measures of student learning outcomes

In general, course grades and student GPAs are not appropriate measures of specific student learning outcomes since they often measure multiple student learning outcomes and include additional components such as attendance, class participation, and effort. Final exam grades also frequently measure multiple student learning outcomes.

Appropriate Measures for Program Outcomes

Whereas student learning outcome measures focus on the quality of student performance in a specific area of learning, program outcome measures typically focus on the quantity of activities within a program or the number of students completing an activity. Program outcomes reflect the services a program provides or expected student achievement in program areas such as retention, graduation, licensure, certification, or job placement rates. Examples of direct measures for program outcomes are tracking the number/percentage of students who complete a specific task or reach a specific achievement level, and tracking the number/percentage of projects or activities implemented by the program.

Examples of Student Learning Outcome/Measure Pairs

From an undergraduate program:

- Students in the BS Biology program will explain the use of cells and biological materials in biotechnology.
 - Direct Measure 1: Final exam questions in BIOL 4050. This exam includes two short-answer questions in which students are asked to explain the use of cells in biotechnology and two short-answer questions in which students are asked to explain the use of biological materials in biotechnology. Answers for each exam question are scored from 1 to 4 points.
 - Direct Measure 2: Case study project in BIOL 4050. Students are required to complete a case study project in which they explain the use of cells and biological materials in biotechnology. This case study is rated with a rubric designed to evaluate students' knowledge on each concept independently. The scale for the rubric is as follows: 1 = significantly below expectations; 2 = somewhat below expectations; 3 = meets expectations; 4 = slightly exceeds expectations; and 5 = significantly exceeds expectations.
 - Indirect Measure: Graduating student exit survey. Students are asked to rate their level of knowledge regarding the use of cells in biotechnology and the use of biological materials in biotechnology (each concept is rated independently). Each survey question utilizes the following 5-point Likert scale: 1 = needs improvement; 2 = below expectations; 3 = meets expectations; 4 = exceeds expectations; and 5 = exceptional.

From a PhD program:

- Students in X program will be able to synthesize relevant literature in the field of X.
 - Direct Measure 1: Preliminary examination. Students are required to synthesize relevant literature in the field of X in their response to one of the four exam questions. This question is rated with a rubric that has items designed to assess students' ability to synthesize relevant literature. The scale for the rubric is as follows: 1 = significantly below expectations; 2 = somewhat below expectations; 3 = meets expectations; 4 = slightly exceeds expectations; and 5 = significantly exceeds expectations.
 - Direct Measure 2: Dissertation. Students are required to synthesize relevant literature in the field of X in the Introduction chapter of their dissertation. Dissertation Introduction chapters are rated with a rubric that has items designed to assess students' ability to synthesize relevant literature. The scale for the rubric is as follows: 1 = significantly below expectations; 2 = somewhat below expectations; 3 = meets expectations; 4 = slightly exceeds expectations; and 5 = significantly exceeds expectations.

Examples of Program Outcome/Measure Pairs

From an undergraduate program:

- Students in X program will engage in experiential learning activities (e.g., internships, service learning, undergraduate research, or study abroad experiences).
 - Direct Measure: Tracking of students enrolled in X program who participated in internships, service learning, undergraduate research, or study abroad experiences during the 2015-2016 academic year.

From a MS program:

- Within 12 months after graduation, MS students in X program will have continued on in an advanced degree program or secured employment within the field.
 - Direct Measure: Alumni tracking/survey of students who completed the program the previous academic year.

Contact: If you need assistance or have questions regarding assessment, please visit the Institutional Effectiveness website at <https://aie.vt.edu/institutional-effectiveness.html>.