

Computer Science Department

Faculty Guide to Direct and Indirect Assessments

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Understanding assessments can be challenging for all faculty, but can be especially daunting to those new to the department. Here, we describe two types of assessment – direct and indirect, and provide examples of how to write useful assessment questions for each.

1 Direct Assessment

Direct assessments are the preferred type of assessment by faculty members. Direct assessments allow faculty members to examine and observe student learning, and facilitate comparison of this knowledge against defined learning outcomes [1]. Common formats for direct assessment include written or oral exams, quizzes, demonstrations and reports [1]. Direct assessment provides a strong indicator of student performance.

Example Direct Assessment Questions

Although direct assessment of student learning provides a quality indication of student knowledge, not all direct assessment questions are created equally. The following example provides a poorly formed direct assessment question:

True/False: Quicksort is the most efficient sorting algorithm.

The preceding example is a poor choice to measure student learning because it simply requires students to match sorting algorithms with their relative efficiencies; rote memorization, rather than a deeper understanding of the manner in which the sorting algorithm functions, is encouraged.

The following demonstrates a direct assessment question that more adequately tests the students' understanding of the topic:

Compare and contrast Quicksort and Bubble Sort in terms of algorithmic complexity and efficiency.

This time, the preceding question measures student learning at a deeper level – examinees are required not only to know the manner in which Quicksort operates, but must be able to compare and contrast its operation against a different algorithm that accomplishes the same objective – sorting an array.

2. Indirect Assessment

Not all learning is able to be measured directly. If one of the objectives of a course is, for example, to foster a positive attitude toward a particular subject [1], this outcome may be difficult to quantify via a direct assessment.

Indirect assessments enable faculty to gauge the perceived attitudes of their students in these scenarios to gain insight into how students feel about the quality of their experience. Exit interviews and questionnaires/surveys are common vehicles for indirect measurement, as they allow for students to state their opinions on learning outcomes not well-suited to direct assessment.

Example Indirect Assessment Questions

The following is an example of a question that might be provided on an exit interview at the conclusion of a course, or on a survey given in the middle of a course:

This course provides a good balance between theory and hands-on application of principles.

- 1) Strongly agree
- 2) Somewhat agree
- 3) Neither agree nor disagree
- 4) Somewhat disagree
- 5) Strongly disagree

Assuming that one of the course goals was to provide a balance between describing theoretical principles and giving students opportunities to apply those principles, this question could provide insight into students' perception of whether this goal was met.

3. Standardized Rubrics

The Computer Science Department has developed several standardized rubrics for the assessment of teamwork, oral presentations, and written papers. Instructors are encouraged to use these rubrics where appropriate in their courses. These rubrics are available at: www.usna.edu/CS/Resources/rubrics.php

References

[1] Gloria Rogers Assessment 101: Assessment Tips with Gloria Rogers, Ph.D. – Direct and Indirect Assessment