Foundation of Academic Assessment

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Abstract

Student assessment is being impacted by the global economy concept. Students will be required to demonstrate inventive thinking and problem solving skills. This will require educators to rethink how to assess student's performance. Traditional assessment that focus on subject content and consists of objectively scored criteria referenced tests will not meet future assessment requirements. Performance assessments will adequately measure many of these higher level thinking skills. The foundation of performance assessment is the performance objective that must possess validity. This validity is determined through a thorough needs assessment that results in educational goals that define the performance objectives. These objectives will then be the source for performance based assessment.

Foundation of Academic Assessment

Student performance assessment is rapidly changing as educational institutions face challenges largely brought about by the new global economy concept. This emphasis on a global economy has established a requirement for students to move into the market place with more inventive thinking and problem solving skills than students of past decades (CEO Forum, 2001). In order to meet these new challenges, students will be required to not only understand the basic concepts and theories but also use higher order thinking and problem solving skills. Students will be required to be information literate. Doyle (1992) defined information literacy as "the ability to access, evaluate, and use information from a variety of sources." (p. 2) From an assessment standpoint, this requires educators to rethink how to assess to student's performance.

Definition of Assessment

In its general usage, assessment is the process of systematic gathering, interpretation, and use of information about student cognitive, behavioral and attitudinal outcomes for purposes of improvement. It determines a rate or amount and is used as an activity to measure student's change in behavior (learning) and other human characteristics. According to Smith and Ragan (1999) assessment serves two purposes: 1) provides information on student's performance and 2) how well the instruction is designed and/or presented.

Traditional assessment normally focuses on subject content and consists of objectively scored criteria referenced tests consisting of multiple-choice, true/false and/or short answers questions. This type of assessment focuses on the acquisition of and the memorization of factual information. It can be argued that this type of assessment cannot adequately measure many higher level thinking skills nor can it be used to measure many other important institutional goals (Baird, 1997). On the other hand, performance based or authentic assessment deemphasizes specific content, focuses on broader outcomes and is grounded in the authentic, real-life activities conducted in the classroom and/or laboratory (NcNeir, 1993; Armstrong, 1998). It requires students to construct a response, create a product and/or perform a demonstration (DODEA 2002).

Foundation of Assessment

The foundation of academic assessment is the performance objective. The performance objective defines the outcomes that students are required to perform at the completion of the instruction. Most traditional instructional development models are in agreement that instructors should develop their assessment tools directly from the performance objectives. This holds true regardless of the type of assessment or whether the instructor is measuring lower order thinking skills defined in Bloom's Taxonomy (Bloom, Mesia and Krathwohl,1964) as observations and recall of information; or higher order thinking skills that

require the comparison and discrimination between ideas, assess value of theories and presentations, make choices based on reasoned argument and verify value of evidence.

If the performance objective does not reflect the level of behavior that the student is expected to perform at the completion of the instruction the assessment process will be flawed. In the case of performance assessment, it must possess *concurrent* or *predictive* validity. That is, how well the student will perform beyond the classroom and in the real world (Eisner, 1999). According to Wiggins (1994) assessment can only be an integral part of the learning process when it reflects the learning objectives. As an example, if the instructor develops a performance objective that requires the student to demonstrate a problem solving behavior then the student should be assessed on his/her ability to solve a problem. Often however, the student is not assessed on this behavior. He/She is given a criterion referenced examination that only measures lower order thinking skills.

Identifying the Need(s)

If the performance objective is the foundation for assessment, then it is extremely important to understand how it should be developed. The first step in developing performance objectives is to identify if there is a real need for the instruction. Dick and Carey defined need as "a gap between what is and what should be." (p. 15) Concurrent or predictive validity can only be established by conducting a thorough needs assessment.

Often performance objectives are developed in a vacuum without a clear understanding of the need(s). As a result, the gap that was first identified is never closed. Therefore several different parties should be involved in identifying the need(s). All curriculum and teaching decisions should be based on the need(s) and how best to facilitate the desired outcomes. These outcomes should be a consensus derived from the community or organizational vision of the skills and knowledge students are required to master in order to be effective adults and/or productive workers. It focuses the instruction on ensuring that students master those outcomes and it asserts that all students can succeed. In higher education it should be, at a minimum, the institutional educators and industry that will be hiring the graduates defining the need(s). If the educator works hand-in-hand with the industry and vice-a-versa, the need(s) can be accurately identified (McNeir, 1993).

Develop the Educational Goal

The next step is to identify the educational goal(s) that are based on this assessment. Educational goals are very broad, generalized statements focusing on what the student should be able to do when the education is completed. It is important to understand that the goals setting process may be influence by more that just need(s). Instructional design often takes place in a specific context. This context could include political, economic, technical or academic issues. The selection of any educational goal

should be done in terms of the following concerns:

1. Are there sufficient people and time to develop the instruction for this goal?
2. Are the goals acceptable to those who must approve this instructional development effort?
3. Will the development of this instruction solve the problem that led to the need for it? (Dick and Carey 1990)

Goal Domain

There are generally three domains in which goals can be performed and it is extremely important that considerable thought be given to identify the domain in which the goal is. The domains can include the: intellectual, psychomotor, or affective domain. The intellectual domain requires the student to demonstrate a unique cognitive activity, such as, problem solving. The psychomotor domain includes both mental and physical activity. Maintaining an aircraft at a specific altitude and airspeed is a good example of behavior in the psychomotor domain. The most difficult domain to assess is the affective domain. This domain includes behavior that requires the student to make choices and decisions. The problem with assessing a behavior in this domain is that change does not occur in a short time. Therefore affective domain types of goals will be long-term goals that cannot be measured until the completion of all of the instruction. The

assessment of this type of behavior can include the measurement of both psychomotor and cognitive skills (Dick and Carey 1990).

Developing the Performance Objective

From these instructional goals performance objectives are developed. Performance objectives were popularized by Robert Mager in the 1960s. A performance objective indicates the observable behavior that a student will do to demonstrate that the lesson has been learned. The verb used must be an action verb that is measurable (observable). Performance was described as "an intended result of instruction rather than the process of instruction" (Mager, 1984, p. 5). The tradition performance objectives contain the following:

1. Performance: an objective always says what a learner is expected to be able to do.
2. Conditions: an objective always describes the important conditions under which the performance is to occur.
3. Criterion: wherever possible, an objective describes the criterion of acceptable performance by describing how well the learner must perform in order to be considered acceptable.

When using performance assessment, there are three key features that should be considered.

1. The student constructs the responses rather than selecting it.

2. The assessment format should allow the teacher to view the student's behavior that is based on real world requirements.
3. Establish scoring that reveals a pattern in students learning and thinking (Fuchs, 1995)

Connecting the Performance Objective to Assessment

It is quite easy to connect performance assessment to the performance objective. However, it is extremely important that the assessment is valid and measures the intended learning outcomes. This outcome depends upon the needs/task assessment that was completed early in the instructional design process. The task must to be tied to real-work performance that reflects workplace and everyday activities. It is also critical that a realistic environment be identified in the conditions of the performance objective. This will help tie the behavior back to the original tasks that was determined from the needs assessment.

Defining the Aviation Industry Needs

The field of aviation education lends itself to performance assessment. Aviation universities must produce students that not only understand basic concepts and theories but they must possess higher order thinking and problem solving skills. Their success is driven by the aviation industry. As a result, aviation educators must continually define the needs of the aviation industry. An educator cannot identify the need(s) in isolation nor can the industry expect the educator to know their need(s). This requires educators and aviation industry representatives to work together to define the need(s). Once the need(s) is/are identified, the educational institutional can then define their educational goals. These goals then will determine the students' performance requirements and only then can the instructor develop valid performance objectives. These objectives will then be the source for performance based assessment.

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