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ABSTRACT

A sound performance evaluation system uses a multitude of assessment methods to gather information and data about the performance of an individual. Four models are described that have been used with multiple assessment results to make decisions about performance. In a compensatory model, weak performance on one measure or attribute can be traded off against strong performance on others when calculating a score. The conjunctive model requires that the individual attain a minimum level of performance (e.g. cutoff or passing score) on each of the assessments. A combined model uses features of both the compensatory and conjunctive models, and is used when decisions are made at two or more decision-making levels. The first three models require some minimum level of performance by the individual on all assessments, but the disjunctive model requires only that the individual have an acceptable level of performance on one of the assessments to demonstrate satisfactory or minimally acceptable performance. Examples are provided for each of these models and are summarized in Table 1. (Contains 7 references.) (SLD)

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A sound performance evaluation system uses a multitude of assessment methods to gather information and data about the performance of an individual (Shulman, 1988; Wheeler, 1993). Each of these assessments yields a result and, in some cases, multiple results or scores. To make decisions about education, career and personnel actions (e.g., passing a course, admission to a college, licensure, hiring, retention/dismissal, promotion), data must be combined in some appropriate manner and subjected to prespecified decision rules.

Several approaches have been identified for using multiple assessment results to make decisions (Mehrens, 1990; Scriven, 1991). Four of these are described below; examples are provided for each and summarized in Table 1.

Compensatory Model

In a compensatory model for using multiple assessment results, weak performance on one measure or attribute can be traded off against strong performance on others when coming to a decision or calculating a total score. For instance, a cook might make excellent salads and sandwiches, but does only a fair job of making soups. The owner might be willing to hire or retain such an individual in a restaurant, even though further training on preparing soups would be required, or another employee hired to make soups. A student might be able to pass a course, even though he/she failed an important unit test or the final examination, if results on other tests during the course were high enough to offset this poor performance.

Usually compensatory models have a minimum required level of performance whereby "overscores" in one area can offset "underscores" in another area. That is, performance below some absolute minimum level of performance cannot be offset by high performance on another assessment (e.g., a median rating of 7.5 on an assessment is passing; a 6.5-7.4 on this assessment can be offset by a 9.0 or higher on another assessment; anyone with a median rating below 6.5 on this assessment does not pass). An individual might be allowed to offset one "unacceptable" result with one "excellent" result, but cannot offset two "unacceptable" levels with two, or even three, "excellent" results. An individual might be allowed to receive an "unacceptable" level in some attributes, but not in other attributes (regarded as critical). These are examples of issues that must be covered in the policy's decision rules for using multiple assessment results.

Conjunctive Model

The conjunctive model for using multiple results requires that the individual attain a minimum level of performance (e.g., a cutoff or passing score) on each of the assessments. This approach is suitable when all attributes being assessed are critical for minimally acceptable performance. For example, a paramedic should demonstrate a minimum level of performance on several tasks (e.g., controlling bleeding, rescue

breathing, cardio-pulmonary resuscitation, moving an injured person). A paramedic who could only do three of these at a minimally acceptable level and could only learn the fourth with time and experience is not the most desirable person at the scene of an emergency.

In a small business, a conjunctive model approach can be important. Reliance on one person to manage an office or a shop if he/she could not satisfactorily perform all necessary tasks would be irresponsible. For example, a carpet salesperson must be able to explain the advantages and disadvantages of different types of carpets, be familiar with the offerings available through the store (either on hand or with special order), provide information about available installation services, operate the cash register, and process credit card purchases. If the salesperson staffing a store could not perform such essential tasks at a minimally acceptable level, he/she might cause financial loss to the owner.

A conjunctive model is typically used for driver tests. To obtain a license, a person must pass a written test of knowledge, a vision examination, and a road test. We would not want to issue driving licenses to persons who passed two of the three tests, even if they barely failed one of them and did quite well on the other two.

Combined Model

A combined model uses features of both the compensatory and conjunctive models. This model is used when decisions are made at two or more decision-making levels. For example, students must complete a series of assessments to pass certain courses. Usually, at the course level, teachers use a compensatory model. That is, a student can pass a course even if he/she fails one or more tests or assignments. However, to graduate, the school may use a conjunctive model where each of several requirements must be met. Such requirements might be passing a certain number of courses in various subject areas with at least a "C," writing a satisfactory senior thesis, and passing all three tests in an academic skills battery.

Disjunctive Model

The first three models require some minimum level of performance by the individual on all assessments. This is not the case with the disjunctive model. An individual needs only to have an acceptable level of performance on one of the assessments used to demonstrate "satisfactory" or "minimally acceptable" performance.

This model is defensible when there are several ways to demonstrate satisfactory performance or multiple assessments of the same performance attribute. The disjunctive model may also be appropriate in cases where retakes are permitted; here, users may consider only the highest score, or a typical/average score, or the most recent score, and drop the other scores on that same assessment from consideration.

The disjunctive model is not appropriate if all domains are essential for satisfactory knowledge of a subject or performance in a job. A student would not pass an American history course if he/she only passed the test on the Civil War era and failed the tests on the other periods of American history.

The disjunctive model is probably the most efficient of the models for the number of assessments given. If an individual demonstrates satisfactory performance in an area on one assessment, then that individual need not be further assessed in that area. For

example, if a teacher demonstrates satisfactory written communication skills by preparing an informational memorandum for other teachers at the school, then he/she will not have to complete other measures of written communication, such as a letter to parents on their child's progress during the past two months, or a short essay summarizing the content of a proposed text book. A college student can demonstrate fulfillment of a course requirement by taking and passing that course, or by passing a test, or by completion of an independent study program, or by completing a series of related courses.

Table 1.

Examples for Each Model for Four Assessments

Model	Assessment: A	B	C	D	Decision
Compensatory					
Person 1	Pass	High Pass	Barely Fail	Pass	Pass (B offsets C)
Person 2	Pass	Barely Fail	Pass	Pass	Fail (B not offset)
Conjunctive					
Person 3	Pass	Pass	Fail	Pass	Fail (must pass C)
Person 4	Pass	Pass	Pass	Pass	Pass (passed all)
Disjunctive					
Person 5	Fail	Pass	Fail	Fail	Pass (must pass only one)
Person 6	Pass	Pass	Pass	Fail	Pass (only had to pass one)

Summary

There must be a sound rationale for the selection of a model and the specification of a formula or rule for use in making decisions based on multiple assessment results. Thorndike and Hagen (1955) emphasize the importance of basing procedures for combining multiple results on empirical evidence (e.g., regression analysis) rather than intuitive judgments, although this is possible only if sufficient empirical data are available.

Standards for satisfactory (or passing) performance levels for each assessment used in the evaluation process must be set in an appropriate manner (see Livingston and Zieky, 1982). Thoughtful deliberation must be given to the tradeoffs of fairness to different parties. Giving the benefit of the doubt to the individual versus the needs of others and of protecting clients from individuals who should not be licensed or working in certain situations should be considered carefully.

Whatever decision making model is adopted, the policy must state the rationale for selecting it. The procedures for implementing the model and the process of using multiple results for decision making must be provided, with adequate lead time, to all involved, including the individuals being assessed. Decision makers must be carefully trained and procedures should be in place for ongoing monitoring to ensure that the models are implemented in a sound, fair, and accurate manner.

Validity issues should also be addressed in the policy. The following questions are examples of matters concerned with validity. Are those students who have been admitted to the college able to succeed academically? Are new employees able to perform their jobs in a minimally acceptable manner? Are students who passed a course or a grade level able to do academic work in the next course or grade level? Do individuals who are licensed to practice a career perform in accordance with the regulations and guidelines for that field?

The possibilities for retakes of each assessment used and an appeals process must be formulated and in place so that individuals can request another assessment administration or can challenge decisions based on the use of these models. Exceptions to these procedures and the decision rules should be made with care, for once an exception is made, there will likely be pressure to make more exceptions. A review of the appropriateness of the model and the decision rules based on it should be made at least once every three years, and changes made if needed.

Given the plethora of data available for assessing an individual's performance, it is critical that all information be used in a manner that will lead to sound decisions, both for the sake of the individual and for their clients, their employers, and their community.

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