Methods of Determining Core Competencies of NDT Personnel

Robert J. Potter

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Abstract

The presentation will center on the importance of developing effective certification examinations using psychometric principles. The discussion will focus on the anatomy of an ASNT examination question with emphasis on question development, attribution and validation. The foundation of this process serves as the basis of the ANSI 17024 accreditation that ASNT has earned as a certification agency.

In developing certification examination questions, a committee of subject-matter experts work with an experienced psychometrician (testing expert with a background in statistics) to determine the level of performance that corresponds to minimal competence of a specific inspection method. The need for a new or revised examination questions is driven by statistical analysis that involves how effective the question is serving in determining competence. This process considers many factors – how many examinees got the question correct, how many examinees that failed the examination got the question correct, how many examinees that passed the examination missed the question…. Examination questions must be attributed to a topical outline (body of knowledge) in an industry accepted document such as ANSI/ASNT CP-105. The subject matter expert must also classify the question based on six criteria and skills. The criteria include knowledge (major ideas, recall of information…), comprehension (understanding information, predict consequences…), application (use information, theories, concepts…), analysis (seeing patterns, organization of parts, recognition of hidden meanings…), synthesis (use old ideas to create new ones, relate knowledge from several areas…), and evaluation (compare and discriminate between ideas, make choices based on reasoning…). An estimate is made as to how many qualified examinees will answer the question correctly. Once developed, the question is reviewed by other method experts (Level IIIIs with certification in the NDT method). They review the question for sentence structure, clarity, body of knowledge attribution, classification, difficulty level and the correct answer. If there are different difficulty levels based on the peer review, an average is taken and assigned to the question. This process is later validated by statistical analysis of which will be discussed.