Cherednichenko O.Yu., Riabko O.V., Timchenko K.A., Timchenko M.A.
NTU "KhPI", Kharkiv, Ukraine

The assessment framework for decision-making based on quality criterion

This work is devoted to design of a schema for the evidentiary assessments of quality. Evidence models are a particular form of reasoning; they provide explicit, formal rules for how to integrate the many pieces of information that may be relevant to a particular inference about quality. An evidence model describes reasoning from the observations to quality assessment. There are two parts of the evidence model: scoring and measurement components. The scoring component of the evidence model contains procedures for extracting the salient features of quality – i. e., observable variables – and the measurement component defines how the observable variables influence the quality. Taken together, they make explicit the evidentiary grounding of an assessment.

There are three basic approaches for evidence model construction: Qualimetry Theory [1], Network Systems of Comprehensive Assessment [2] and Item Response Theory [3].

The Qualimetry Theory (QT) provides the generalized principles of quantitative assessments of quality [1]. According to QT an estimated object is presented by integrated quality that can be decomposed. Every complex quality consists of a set of simpler ones. The scoring model is defined by formalized procedures [1]. The measurement component is carried out by one of the weighted average methods. Thus QT is based on expert judgments, depends on weights of indices and comprehensive quality assessment (CQA) method.

According to Network Systems of Comprehensive Assessment (NSCA) the structure of described system objectives should be developed [2]. Generally the aggregation logic is described by a network. The measurement component is presented as an oriented acyclic graph. The given graph has two types of nodes: node-entries and node-aggregates. The set of node-entries corresponds to the scoring component. The NSCA approach supposes the solution of direct and reverse tasks of comprehensive assessment. This approach allows assessment of heterogeneous objects, has great facilities in order to measurement component construction. The given approach doesn't provide any procedures for scoring component creation. The key problem of discussed approach is how to define the composite functions for every node-aggregate.

Item Response Theory (IRT) represents a probability-based reasoning [3]. Its essential idea is to approximate the substantive relationships in some real world problem in terms of relationships among variables in a probability model. IRT considers the person's ability assessment on the basis of testing. The scoring component is expressed through the questionnaire. The basic IRT model is Rasch one-parametric model. Its extensions for dichotomous items include two- and three-parameter Birnbaum models. The extensions of Rasch model for polytomous items are Graded, Nominal, Partial Credit, Rating Scale and other models. The measurement component provides procedures for assessment of latent one-dimensional variables on the basis of statistical data.

Therefore any procedure considered above can be used in order to build the evidence model of quality. We will apply them to design the framework of education quality assessment.

References

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