

RASCH MODEL USAGE FOR TESTING RESULTS ASSESSMENT

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Each educational institution, regardless of the level of accreditation, has the need to control the quality of the learning material. This allows us to assess both the availability of educational material and the ability to learn each student. Nowadays the most commonly used methods for assessing knowledge are testing. The development of information technologies allowed to automate this process and became the reason for the emergence of modern testing models. One of such models is the Rasch model, a family of psychometric models for creating measurements from categorical data, such as answers to questions. By using this model, it is possible to evaluate the probability of correct answer to a question by assessing its complexity. This allows us to get rid of unbalanced questions [1]. The estimation of parameters is carried out with the assumption of normal distribution of empirical data both in terms of the number of students, and in the set of tasks. The values of the latent variables are normally distributed. Let's consider in more detail how the Rasch model is used to evaluate the results of testing [2]:

1. The proportions of the correct p_i and wrong q_i answers of each person are calculated for all tasks.
2. A preliminary estimation of readiness parameter value of the i -th person in logits is carried out.
3. The proportions of the correct p_j and wrong q_j answers are calculated for each task.
4. A preliminary estimation of task difficulty parameter value of the j -th task in logits is carried out.
5. The calculation of average values of training level and task complexity in logits is carried out. Those way estimates of each parameter are expressed in interval scale, but with different values of mean and different standard deviations
6. Values of training level and task complexity in logits are translated into a single interval scale of standard grades. Standardization is achieved through a series of special transformations.
7. Standard measurement errors are estimated.
9. The characteristic curves of task are constructed.

The described model serves as a mathematical base for the developed automated testing system, the using of which accelerate the overall process of acquired knowledge control and systematize the received results.

References:

1. Xiufeng L. Using and Developing Measurement Instruments in Science Education: A Rasch Modeling Approach / Xiufeng L. – Scottsdale : Information Age Publishing, 2010.
2. Bond T.G. Applying the Rasch Model: Fundamental Measurement in the Human Sciences, 3d ed. / T.G. Bond, C.M. Fox. – New York : N.Y. Routledge, 2015.