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COUNTERACTION TO GUESSING WHEN EVALUATING TRAINERS' KNOWLEDGE

The article presents a method of assessing the knowledge of the trainer, which makes it possible to take into account the impact of guessing answers to questions. As a result of this approach, the assessment of the person being tested decreases depending on the number of guessed answers to the questions. The proposed method will allow a more objective assessment of knowledge, and the student to stimulate seriously prepare for the control of knowledge.
Keywords: *knowledge assessment, testing, motivation, feedback*

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ПРОТИВОДЕЙСТВИЕ УГАДЫВАНИЮ ПРИ ОЦЕНИВАНИИ ЗНАНИЙ ОБУЧАЮЩИХСЯ

В статье представлен метод оценивания знаний обучающегося, дающий возможность учитывать влияние угадывания ответов на вопросы. В результате применения этого подхода оценка тестируемого уменьшается в зависимости от количества угаданных ответов на вопросы. Предложенная методика позволит более объективно оценивать знания, а учащегося стимулировать серьезно готовиться к контролю знаний.
Ключевые слова: *оценивание знаний, тестирование, мотивация, обратная связь*

The authors are extremely interested in the excellent knowledge of our trainees. Since 2008 we have conducted research on the effect of probabilistic characteristics of a generation system of a test sequence on the objectivity of test results in LMS Moodle. We give a brief overview of the results [1].

It was proved that the following factors have effect on the final test assessment of a test:

1. Irregular distribution of questions in case of random generation of test sequences leads to a decrease in the value of the test scores on average by 0,5 points on a 10-point scale.

2. The presence of correlations between pairs of questions within a test sequence leads to a distortion of knowledge control results.

In 2013 we led an experiment to find out how often students come to guessing when choosing the right answer and develop recommendations for eliminating this problem.

The research used the test results of 149 students on the discipline "Operating Systems". Ten questions-"dummies" were added to the database of questions, consisting of 185 questions. These questions may be named "labeled atoms." They have a pseudoscientific meaning. They do not have a correct answer or a priori meaning. Each student received 50 random questions among which were two questions-"dummies".

Answers to questions-"dummies" were not evaluated and did not affect the value of the overall test score. The students were warned that some questions might not have the correct answer before the test. Nevertheless, about 77 % of the tested students gave answers to the meaningless question.

Analysis of test data showed that even well trained students try to guess the correct answer during testing.

We propose to use a nonlinear scale of knowledge assessment by introducing power dependences of the total score on the relative number of correct answers [2]. Each next correct answer has more weight than the previous one.

The following formula calculates the test score value:

$$A = A_{\min} + (A_{\max} - A_{\min}) \cdot \left(\frac{n}{N}\right)^{\alpha}, \quad (1)$$

where $A_{\min}$ – minimum score value; $A_{\max}$ – maximum score value; N – the total number of questions in the test; n – the number of questions that were answered correctly; α – a coefficient in the range from 1 to 5, which determines the nonlinearity of the test score. The coefficient value is determined by empirically.

Graphs of the test score $A = f(n, \alpha)$ for different values of the coefficient α are presented in the figure 1 ($N = 50$, $A_{\min} = 2$, $A_{\max} = 10$).

As can be seen from the graphs presented in Figure 1, the test score is nonlinearly dependent on the proportion of correct answers. The proposed dependence allows taking into account the proportion of correct answers to questions, but it does not allow differentiating grades for students who guess answers.

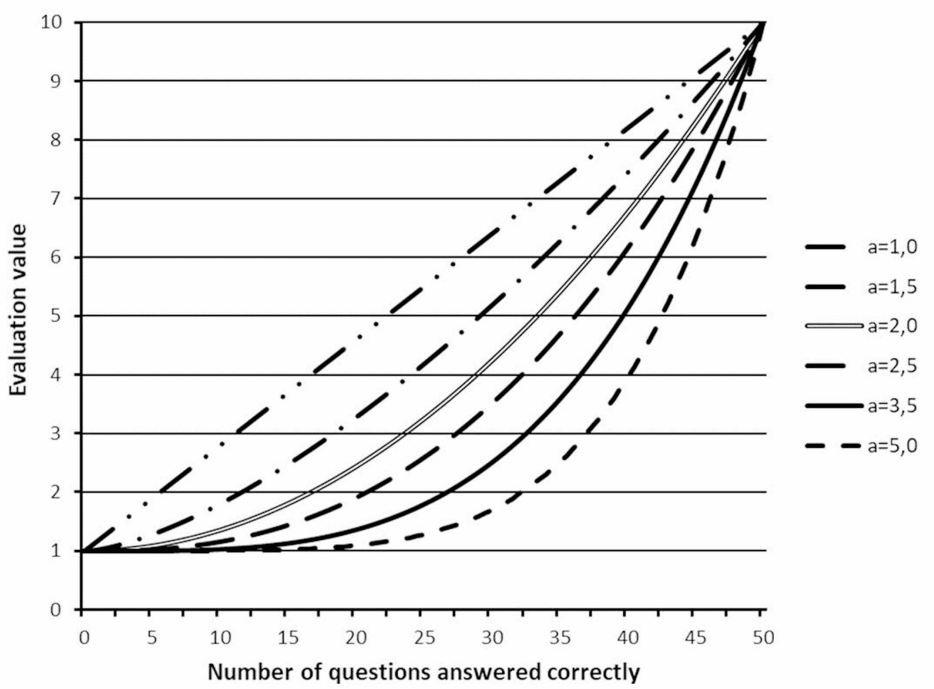

Fig. 1. Function $A = f(n, \alpha)$ for $N = 50$, $A_{\min} = 2$, $A_{\max} = 10$

In order to take into account the effect of guessing the correct answers to the overall assessment is necessary to modify the formula 1. We introduce the coefficient η, which we call the coefficient of the pretensions (claims) level. It is directly proportional to the number of questions the student answered correctly (formula 2). Students should be warned to introduce this coefficient.

$$A = A_{\min} + (A_{\max} \times \eta - A_{\min})\left(\frac{n}{N \cdot \eta}\right)^{\alpha} =$$

$$= A_{\min} + (A_{\max} \times \eta - A_{\min})\left(\frac{n}{m}\right)^{\alpha}, \qquad (2)$$

where $\eta = m / N$ – the coefficient of the pretensions level; m – total number of questions answered.

Graphs of the test score $A = f(n, \eta)$ for different values of the coefficient η are presented in the figure 2 ($N = 50$, $A_{\min} = 2$, $A_{\max} = 10$, $\alpha = 2{,}5$).

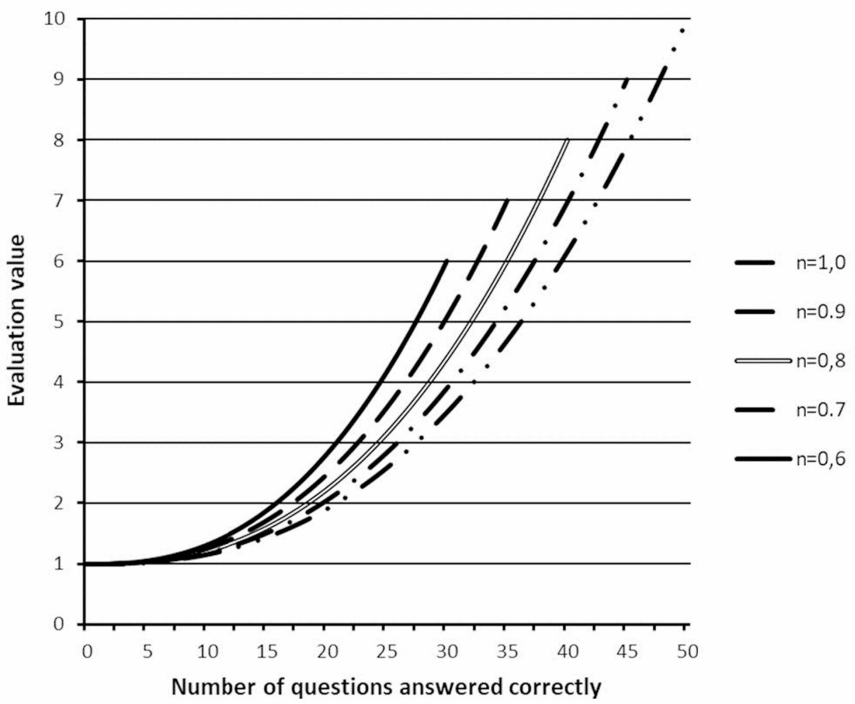

Fig. 2. Function $A = f(n, \eta)$ *for* $N = 50$, $A_{\min} = 2$, $A_{\max} = 10$, $\alpha = 2{,}5$

Using formula 2 to calculate the test scores makes it possible to differentiate the assessment obtained for the same number of correct answers depending on the total number of answered questions. The proposed technique allows to obtain more objective assessment of knowledge. The student is encouraged to serious preparation for the test.

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