

Method of Performance Evaluation of Tasks in E-Learning Systems

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Abstract. In this paper the method of performance the evaluation of students' self-made works in distance learning systems is carried out. The aim of methodology is to encourage students to make quality work in time. To do this, it is assumed the final assessment will depend not only on the quality of work, but also on the spent time for work, the duration of the visit of the resource. The paper presents a visualization of the results of this technique.

Keywords: electronic resource, e-learning, visualization, final evaluation

INTRODUCTION

Currently, information technologies are being actively implemented in the educational process of high education, in order to ensure continuous and easy access to all the necessary materials. There is a large number of local and global electronic resources created to educate students. The most of local systems are based on Moodle, eFront, WebTutor. Examples of global systems are networking academies (eg, Cisco, Huawei, Microsoft, Intel, etc.) and universities (for example, "National Open University "INTUIT" in Russia).

At present time elearnig is very popular. Usually state encourages and points to create accessible knowledge base and remote schools and universities, for example, according to Federal Target Programme for Development of Education for 2011–2015 years in Russia. As well, at the request of many universities, teachers create personal electronic cabinets on which they place materials of disciplines. Moreover, the content of these resources is fairly unique, designed for a special course. Online lectures (webinars) are gaining popularity, checking assignments in electronic form and the use of automated tools to assess knowledge saves working time of teacher [1, 2].

On the other hand, when there are many distractions in extracurricular activities of students, arises an important task to stimulate the student to work by himself, not only in university, but also at home, for example like in papers [3, 4]. Also in view of the fact that the relationship between the modern university with students is gradually transformed into the market where the school acts as a seller of knowledge, and the student in the role of the buyer, self-discipline of students is reduced. With all the possibilities for the use of electronic knowledge base for his training, the student simply doesn't make it. To stimulate students to perform homework in a timely manner, within the specified time, to have less time for various

dishonest manipulation with the task, the most rational approach is performance the evaluation with accounting factors (time and quality of work). When task is issued for learners the best students usually perform and pass it before the others. After some time percentage of self-performed tasks decreases (which is especially important if similar task were issued).

EVALUATION OF A STUDENT'S HOMEWORK

Evaluation of a student's homework S that depends from the time t can be represented by the equation (1):

$$S = \begin{cases} f_1(t), \text{if } t < t_1 \\ f_2(t), \text{if } t_1 < t < t_2 \\ \dots \\ f_T(t), \text{if } t_{T-1} < t < t_T \\ 0, \text{if } t > t_T \end{cases} \quad (1)$$

where T – the number of time intervals for grading; t_1, t_2, t_T – limits of time intervals.

Number of different parameters can affect on a final grades. Depending on the requirements of the teacher it can be, for example, the quality of the performed task, completeness of the topic, the accuracy of formalization, etc. As a result, each evaluation parameter $f(t)$ can be represented, for example, as a linear function (2):

$$f(t) = k_1 \cdot x_1 + \dots + k_n \cdot x_n \quad (2)$$

where n – the number of parameters considered in the evaluation; x_1, x_2, x_n – score for each parameter; k_1, k_2, k_n – normalized weighted coefficients for the parameters of evaluation (can be individually selected by teacher).

VISUALIZATION OF PRESENTED METHOD

For visualization of presented evaluation method can be created three-dimensional models [5], which shows the dependence of final grade from two parameters: time and quality.

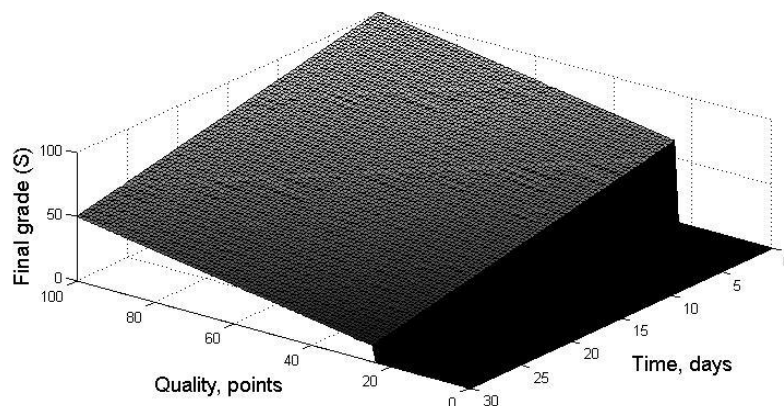


Figure 1. The linear dependence of the final grade from time of performance and quality

Figure 1 shows an example of the visualization of linear dependence of the final grade S (on a 100-point scale) from the given time for task t (in days) and the quality of the performed work (on a scale for 100 points) using two time slots ($S = 0$ for $t > t_T = 30$ days).

The graph shows the evaluation of all possible options, but it is logical that the grade lower than "satisfactory" level (chosen by teacher), does not have a positive value. Usually even if the work is done after the maximum time interval ($t > t_T$) the teacher must determine the maximum value that can earn the homework, and the student will receive either this mark or work will be considered not done. It is reasonable to assume that it is not necessary to evaluate the performance positively, if the quality of performance is low, so in the example in Figure 1 task will be graded only if the level of quality is above 25 points.

If in use of a hundred point scale for final evaluation, it makes sense to specify an equation in which the grade will tend to zero. In the case of the expiration of a long period of time it can be meaningless to put grade, but the work still requires verification, but with graduation – pass / fail. Usually student must make homework before being admitted for exam.

If the relationship is non-linear, but exponential, the final grade can decrease faster with increasing duration of the assignment:

$$f(t) = A \cdot (p_1^{x_1} \cdot \dots \cdot p_n^{x_n}) \quad (3)$$

where A – the maximum value of the final grade that depends on the evaluation scale; p_1, p_n – foundation degree, selected by teacher ($p_1, \dots, p_n < 1$).

Visualization example of the final grade for this case is shown in Figure 2.

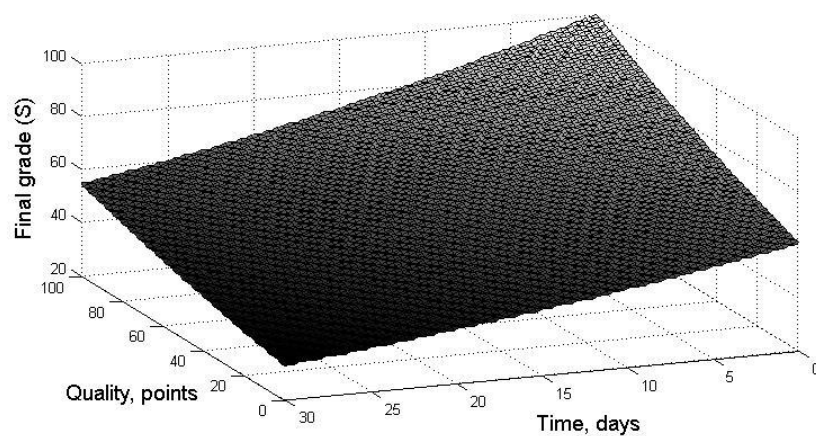


Figure 2. The exponential dependence of the final grade from time of performance and quality

To stimulate students to self-study and review the materials a similar approach can be applied, that tracks time of students attending of course material. Fact of viewing the contents $S_a(t)$ of an electronic resource can be used as a small addition to the final grade S , if it is formed as the sum of the scores for several tests, exercises and attendance (S_1, S_2).

$$S = S_1 + S_2 + \dots + S_a(t) \quad (4)$$

where $S_a(t)$ – grade for viewing the materials.

$S_a(t)$ can be defined as the sum of scores for all views of materials. Fact of viewing the contents of an electronic resource needs to be used primarily for the analysis of educational outcomes. And it shows the reason why the student has not learned (or learned) material.

CONCLUSION

The above time tracking mechanisms may be incorporated into the shell of e-learning websites. In the simplest case method of evaluating homework can be implemented using a table editor (Microsoft Excel, Libre Office Calc) using macros or formulas. To use this technique teacher needs to have interaction with the system only once at the beginning. To establish evaluation the parameter values required such as boundary timeslots (t_1, t_2, \dots, t_T), the weighting coefficients for the evaluation parameters (k_1, k_2, \dots, k_n). Further, when checking the homework it's required to evaluate quality of done task and the system will calculate the final result.

When using the proposed method, consider the following recommendations:

- ✓ students should be warned in advance about the dependence of the final grade for the assignment from time of its implementation;
- ✓ algorithms that implement the procedure should be embedded in the e-learning system in such a way as not to complicate the work of the teacher, have the ability to set the initial values of the default settings and ability to transport parameters between different classes and groups;
- ✓ on the personal page of the student's e-learning system must be created a function that shows the time what has passed since the issuance of the task, and it will serve as a clear, direct incentives to do the work on time.

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