

Formation of Discrete Educational Models in the Developing Human Resources of Business Entities

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Abstract: Education is an integral part of the formation of the national-economic complex of the country and the manpower, as one of the most important factors of internal environment are a source of increase of capitalization of the business entity. The task of higher education, advanced training, retraining of labor resources is to increase the economic prosperity of the country. The article discusses the possibility of forming discrete educational models, quantitative evaluation of these models. The possibility of quantifying results the educational process and maintenance of subjective quality indicators, which are quite often distort the objective picture of reality are considered.

1. Introduction

The discrete model is such a model where the parameters and model variables take a finite number of values at a certain period of time, while a variety of possible solutions is also finite [1]. The educational model, especially at the operating enterprise, is discrete in nature. The economic system is nonlinear and stochastic due to many factors of internal and external environment, discrete models allow us to quantify nonlinear dependence in economic systems [2]. In fact, discrete

– event simulation [3] of the educational process in economic systems is a chronological sequence of stages of the educational process, at which the transition from stage to stage is characterized by the time points at which the qualitative change of the system:

- General education – preschool education, primary education, secondary general education;
- Vocational education – secondary vocational education, higher education: bachelor's, specialist's, then master's, training of highly qualified personnel;
- Additional education;
- Vocational training.

It is necessary to understand that the principle of continuity of education, which is enshrined in the Federal law of 29.12.2012 No. 273-FZ (as amended on 26.07.2019) “On education in the Russian Federation”, is not a continuous function of time, continuity is due to the discreteness – a qualitative change of a system in which the level of education achieved targeted benchmarks in the educational process is changing [4]. Thus, when preparing a qualified specialist, it is necessary to have quantitatively verified data in order to make a conclusion about the transition of the system to a new state.

The chronological description of the discrete model of education for training specialists for the needs of economic systems is present in the main part of the article.

2. Methodology

We used the methods of heuristic analysis in the framework of discrete – event simulation [5], assuming compliance with the chronological events that can be caused by either deterministic values or stochastic [6], as well as the methods for solving problems using the device simulation, since the discrete model is one of the types of simulation model that objectively determines the methods adopted and the use of categorical-conceptual apparatus [7].

3. Results and Discussion

The main problem in describing the chronological sequence is discrete modelling of any process; this problem consists in quantitatively checking the transition from one state of the system to another. The elements of the discrete model are presented in Table 1.

Table 1 Education Levels and Life cycle labor Resources in the Economic system.

Levels/Chronology	The life cycle of labor in the economic system		
	Origin	Development	Labor activity
<i>General education</i>	At this level of economic models, labor activity is not actually generated, and, for obvious reasons, quantifying is impossible		
preschool education			
elementary education			
basic General education			
secondary General education			
<i>Professional education</i>		At this level, quantitative assessment is carried out due to the measuring and control materials and final certification	
bachelor			
specialty			
master			
training of highly qualified personnel			
<i>Additional education</i>			At these levels, it is necessary to develop assessment tools
<i>Vocational training</i>			

Table 1 clearly shows that the third stage of the labor life cycle for business entities requires the development of methods for quantitative evaluation of the state transition system (discrete model).

In order to make a decision at a certain point in time in time, a chronological sequence of receiving additional education, qualification, requalification (not a policy established in chronological order) and a quantifiable indicator that will signal a change in the state of the system are necessary. In the practice of business entities, this is a specified period of time, which is not economically justified, since the costs of third-level education are transferred as conditionally variable costs to the final cost of the product, which affects competitiveness and consumer activity. To offer an assessment tool, we should note the following – what is the

ultimate goal of a business entity? If the answer is in economic knowledge, then the answer is to increase revenue by creating added value and, as a consequence, increasing the welfare of the stakeholders of the economic system. Hence, the efficiency of labor resources can be measured by the increase or decrease in the added value. As a basis, we use the model of the economic value added (EVA) by Stern and Stewart [8] (1).

where EVA is the economic value added, WACC is a weighted average cost of capital, %.

$$EVA = NOPAT - WACC * IC \quad (1),$$

It becomes more obvious when the amount of economic added value is allocated by the categories of labor resources using the weighted average method, and changing trends in this indicator are monitored in chronological order. We can identify three trends (Table 2):

1. The indicator is growing in dynamics, this indicates that the level of education of labor resources is sufficient for an additional increase in added economic value, and the time for changing the system, requiring the inclusion of educational programs, will not come;

2. The indicator stagnates (does not change), the growth is virtually zero, economically speaking, we need to understand that for an economic entity the most important factor in competitiveness is the creation of expanded reproduction conditions, it is impossible for the same amount of added value. Thus, the point in time reflects a qualitative change in the state of the system, which requires the inclusion of educational programs;

3. The indicator of economic added value tends to decrease; this is a direct signal that the level of education of labor resources is insufficient for the effective work of an entity that requires the immediate inclusion of educational programs.

Table 2 Levels and trends in economic value added.

Levels/EVA	EVA		
	Growth	Stagnation	Decline
Vocational training	The change in EVA is positive, the change in the system is missing	The change in EVA is positive, but fluctuates about a constant value, the next stage of the system change	The change in EVA is negative, the presence of qualitative changes in the system
Additional education			

Thus, depending on the quantitative changes of economic added value of the entity we can form a discrete model of the formation of labor resources of the economic system (the economic entity) for the needs of national economic complex of the country.

It can be argued that, for example, the decrease in economic added value of the entity, was caused by internal factors or environmental factors. In most cases this is absolutely true, but the ability to adapt in a changing external environment and internal environment factors is one of the goals of the educational space. The lack of effective responses is the lack of qualifications, first of all, management personnel, what is the evidence once again about a qualitative change in the system state in regressing plane.

The relationship between the levels and effectiveness of discrete educational models are considered in Table 3.

Table 3 Levels and the effectiveness of discrete educational models.

Levels/Model	Discrete educational model		
	Effective	Neutral	Ineffective
<i>General education</i>	According to the results of the final evaluation of the subjects ahead of the median slice of a social group		
preschool education			
elementary education			
basic general education			
secondary education			
<i>Professional education</i>	Formed an effective workforce	Formed the human resources, with a low level of responsibility for result of work	Formed inefficient workforce
bachelor			
specialty			
master			
training of highly qualified personnel			
<i>Additional education</i>	The increase in EVA in chronological order, the reduction of costs	The cost of discrete educational model is conditionally persistent, resolute action is required	Expenses economically unjustified requires a redefinition of the educational model
<i>Vocational training</i>			

An important issue is the content of discrete educational models, as can be seen from Table 3:

The content of models directly depends on the efficiency of labor resources and the level of effectiveness of the implementation costs of the enterprise. This issue requires a substantive discussion and a more subjective assessment of the proposed filling models that the quantitative factor is weakly expressed [9].

4. Conclusion

As noted above, quantitatively we can measure the performance, but not the content. The content as a cause will have a result, which, in our opinion, should be expressed quantitatively. The ability to quantitatively measure the time to establish a chronological sequence of discrete implementation of the educational model is an important factor in increasing the efficiency of the economic entity's activity. The value of the index of the economic added value can directly show us the need to take measures to improve the level of education of labor resources, especially the managerial staff. It should be noted that the discrete model could be a single-threaded or multi-threaded model. In the second case, the task of quantifying is complicated by the matrix calculating the values of economic added value, which as a whole will not critically affect the establishment of the moment the system changes, but will increase the duration of diagnosing the state of the system.

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