

The quality of educational services as a factor of additional financial costs

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Abstract. The article presents a methodology for assessing the quality of educational services in the system of higher education and the results of using the methodology, which characterize the possible consequences of low-quality training of specialists in various industries. The identified trends in the development of the educational sphere justify the need to assess the quality of educational services. These results indicate the presence of significant consequences of the quality of educational services that affect the performance of various sectors of the economy.

Keywords: educational services, higher education, cost, financial costs, quality, quality of educational services

1. Introduction

Changes in economic processes are reflected in the formation of new trends in the development of higher education, which include: (a) a wide diversification of types and types of higher education, its multivariate, diversity and multimoderation; (b) radical transformations and renewal of higher education systems, increasing their flexibility, as well as an ability to anticipate the evolution of consumers, to strengthen ties with other levels and forms of education; (c) constant adaptation of educational programs to future needs, increasing the adequacy of higher education; (d) providing students with an optimal range of choices, giving a flexible character to the “beginning” and “ending” of higher education; (e) the emergence of a new educational field based on contemporary technologies and types of educational services [1].

The most significant is the transition of the higher education system to a two-tier system and the introduction of a competency-based approach. The essence of the competence-based approach is that the content of the educational process is built on the basis of the stated result expressed in competences, i.e. the result is defined as a fundamental principle, and then the content of the process of its achievement is built. The second distinctive feature of the competence-based approach is its dominant orientation towards the practical component of the content of education. These trends determine the need for methodological support for assessing the quality of the results of educational services [9], [10], [11].

Educational services in the higher education system are aimed at training specialists in all fields of activity. The level of quality of educational services in the process of its implementation directly affects the quality of its results, which directly affects the results of work activities of the individual who received educational services.

2. Materials and Methods

The article is based on statistical data in the field of education of the Russian Federation and empirical data obtained by the authors when conducting their own research.

The economic importance of the prospects and quality of educational services in the development of society has been characterized in the works of R. Dzhaparova, O. Arefiego, A. Arutyunova, T. Burmenko, N. Yeletsky, S. Zaychikova, H. Williams, J.-F. Leresche, B. Wulfson, J.-F. Antonetti et al. The issues of assessing the quality of educational services are reflected in the works of A.I. Wroyenstein, E.N. Gevorkyan, A.V. Galichev, M.A. Gusakovsky, N. N. Belova, A. T. Petrova and others.

In the process of collecting and processing data of the author's research, the methods of system and logical, correlation and regression analysis, analogy and modeling, mathematical statistics and formalization were used.

3. Results

To identify the impact of the quality of educational services on financial results, the authors proposed a methodology for assessing the quality of the educational services of a university based on the mastering of competences.

The theoretical aspects of the methodology for assessing the quality of educational services developed by the authors are set out in the works [2], [3]. The system of indicators of the methodology includes individual indicators using which a mathematical model has been developed for assessing the quality of educational services of universities based on the indicator proposed by the authors - the degree of graduate professional competence (Table 1). The degree of professional competence (DPC) is an integral indicator of the levels of formation of all graduate competencies declared by the Educational Standards GEF VO / GEF VO (3 ++) and reflecting the quality level of his professional readiness to fully carry out labor functions in relevant professional fields.

Table 1. The system of single indicators for assessing the degree of professional competence of graduates.

Indicator	Calculation method	Information base
$U(x_i)$ is the level of formation of common cultural / universal competence	$U(x_i) = \sum_{i=1}^n Q(x_i) \div L$	Test results
$U(y_j)$ is the level of formation of general professional competence	$U(y_j) = \sum_{j=1}^m Q(y_j) \div L$	Test results
$U(z_k)$ is the level of professional competence	$U(z_k) = \sum_{k=1}^p Q(z_k) \div L$	Test results

The model for assessing the quality of educational services of universities based on competencies is proposed to be determined by the following formula (1):

$$DPC = (\sum_{i=1}^n Q_i + \sum_{j=1}^m Q_j + \sum_{k=1}^p Q_k) \div (L \times (n + m + p)), \quad (1)$$

where "Q_i" is the points scored by a student during testing when assessing a specific general cultural / universal competence; "i" is an index reflecting the number of general cultural / universal competence in accordance with the GEF VO or GEF VO (3 ++) from 1 to n; "Q_j" is the points scored by the student during testing when assessing a specific general professional competence; "j" is an index reflecting the number of general professional competence in accordance with the GEF VO / GEF VO (3 ++), from 1 to m; "Q_k" is the points scored by a student during testing when assessing a specific professional competence; "k" is an index reflecting the number of professional competence in accordance with the GEF VO-3 or GEF VO (3 ++), from 1 to p; "L" is the maximum possible number of points when testing; "n" is the number of general cultural / universal competences; "m" is the number of general professional competencies; "p" is the number of professional competencies.

As part of the research conducted by the authors, the hypothesis is advanced that the insufficient level of the quality of training of specialists has a direct impact on the financial results of the activities

of economic entities of different industries. We will consider this on the example of non-production (trade) and production (construction) activities (Fig. 1).

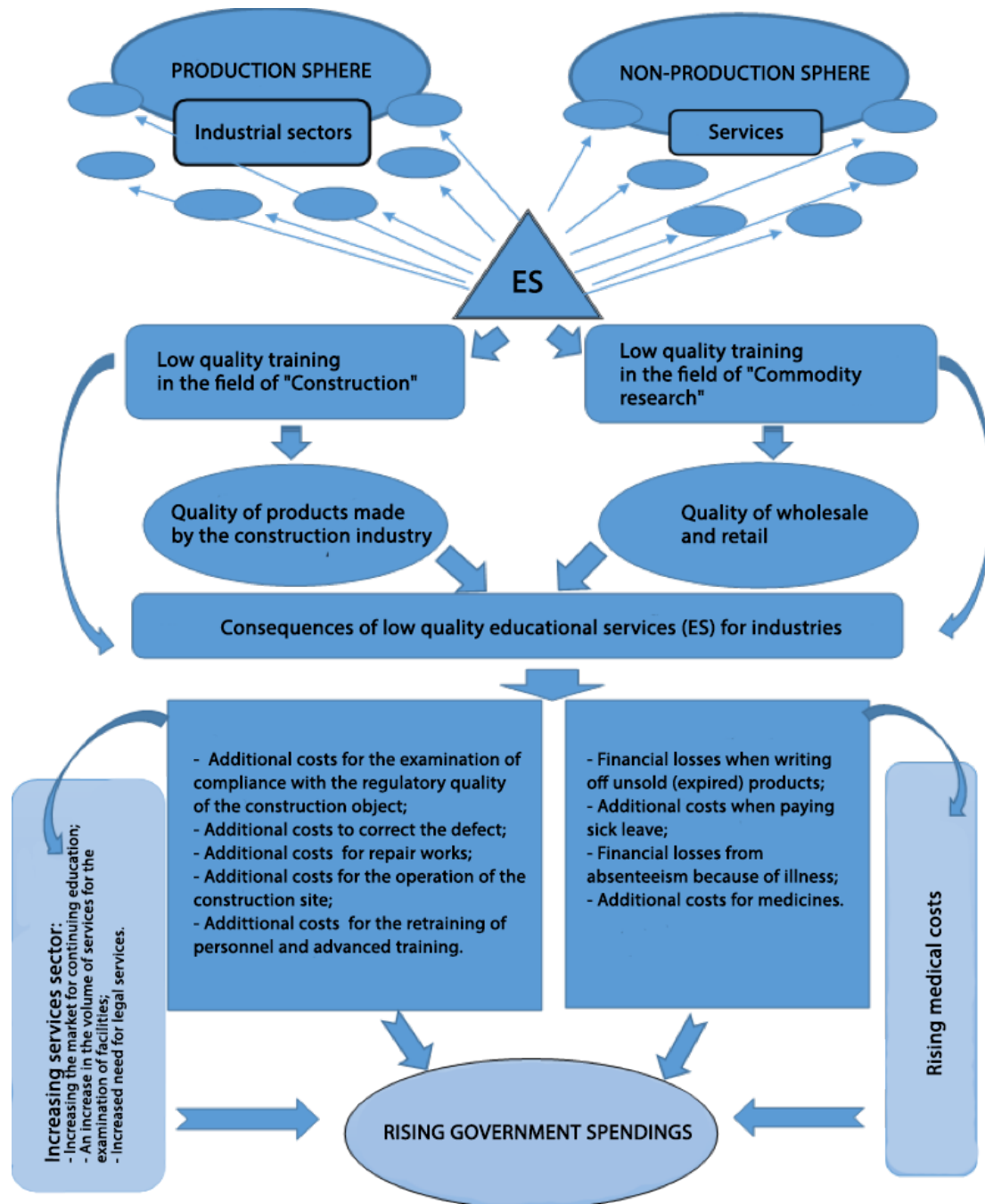


Figure 1. The impact of the results of assessing the quality of educational services on the performance of various industries [compiled by the authors].

Until recently, these industries acted as the drivers of the Russian economy [3], [4]. The data show that insufficient quality of educational services leads to a number of additional costs. Testing of the methodology was carried out on the example of graduates of the Siberian Federal University working in the field of trade (a large trading network of the Krasnoyarsk Region) and at construction enterprises of the city of Krasnoyarsk. On the basis of testing data, the identification of the dependence of the

amount of additional financial costs of the enterprise on the degree of professional competence of the employees was carried out.

Table 2. Comparison of indicators on the degree of professional competence of workers and the amount of additional financial costs of the construction company.

The master of the construction site is located at the following address	Degree of professional competence	% of additional costs from the planned value of the object
1. Karamzin street, 14	0.81	1.75
2. Karamzin street, 16	0.79	1.97
3. Vilskogo street, 34	0.77	2.11
4. Borisova street, 40	0.71	2.54
5. Borisova street, 42	0.75	2.31
6. Borisova street, 44	0.7	2.73

Table 3. Comparison of indicators on the degree of professional competence of goods managers and the amount of additional financial costs of a commercial enterprise.

Number of employees	Degree of professional competence	% of additional costs from turnover
No.1	0.81	0.33
No.2	0.80	0.36
No.3	0.79	0.39
No.4	0.75	0.41
No.5	0.80	0.35
No.6	0.78	0.40

Based on the results, the following is determined: the lower the degree of professional competence of the employee, the higher the amount of additional financial costs of the enterprise, and vice versa.

The presence of the revealed dependence is confirmed by the results of the correlation-regression analysis (Table 4).

Table 4. Comparison of the data on the correlation-regression analysis of the identified dependencies in selected areas of activity.

Indicator	Merchandising	Construction
Correlation coefficient (r)	- 0.884	- 0.993
The relationship between the test signs	Inverse	Inverse
The tightness (strength) of communication on the Cheddok scale	High	Functional
Coefficient of determination (r^2)	0.781	0.987
Mean approximation error	3.2%	1.4%

The correlation coefficient determines the strength of dependence and the nature of the relationship, which is the opposite in both cases. In accordance with the Cheddok scale, the bond strength in merchandising is high, and it is functional in construction. The coefficient of determination in the "Construction" is higher by 0.206 than in trade. The factor sign (x) determines 98.7% of the variance of the dependent sign (y), which proves the absolute and direct influence (x) of the degree of professional competence on (y) the amount of additional costs of the construction company. For commodity science, the coefficient of determination is lower by 20.6% than in construction.

4. Discussion

The problems of assessing the quality of educational services are particularly relevant in the scale of the world educational space, which is confirmed by the presence of a variety of methods (Table 5).

Table 5. An overview of the methods used for assessing the quality of services.

Method name, authors	Advantages	Disadvantages
Five-step model of service quality (V. A. Zeithaml, A. Parasuraman, L. L. Berry). [5]	A study of consumer perceptions on the service quality criteria. The process of providing services is divided into stages, which allows to determine the stage at which the gap occurred.	Its disadvantage is the “perception of the quality of service” taken as the basis for evaluation, which (due to the subjectivity of the judgment of the “appraiser”) can be biased and reduce the reliability of the final assessment.
SERVQUAL technique [6]	Ease of use (conducted by the subject’s own), a lack of special preparatory work; an ability to identify key areas for improving performance; a graphic presentation of the results obtained.	Lack of a detailed assessment of service quality criteria and reference service organizations adopted as a standard; carelessness of respondents when filling out all parts of the questionnaire.
The concept of the neutral zone of C. Bernard E. R Cadotte, N. Turgeon [7]	The method allows to build a simple and visual model of perception and evaluation of service quality; to predict the assessment of the quality of new services; to compare the quality of service ratings of different categories of respondents.	The method is based on the hypothesis of independent perception and does not take into account the interrelationship of the perception of various elements of service that can strengthen or weaken each other.
“Theory of Attractive Quality”, Noriaki Kano [8]	It provides the ability to determine the relationship between product upgrades, market dynamics and customer satisfaction; It allows one to use approaches to the design and manufacture of products / services with the interests of consumers.	Consumer requirements change over time.

These tables show that the methodologies are based on individual indicators, depending on local factors, which does not allow for a comprehensive assessment of their quality; they make it possible to identify only problem areas of the quality of educational services and give too conditional, descriptive parameters of the quality of education. Consequently, these techniques do not reflect the specifics of the competence format of education.

The method proposed by the authors differs from the existing ones in that it is adapted to the requirements of the competence-based approach and reflects the quantitative parameters of the quality of the result of the educational service; and this technique has a comprehensive assessment of the quality of educational services.

5. Conclusion

The identified trends in the development of the educational sphere justify the need to assess the quality of educational services. Testing of the proposed methodology confirms the authors’ hypothesis about the impact of the quality of educational services on the performance of business entities. These results indicate the presence of significant consequences of the quality of educational services that affect the performance of various sectors of the economy.

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