

PEDTR 2019**18th International Scientific Conference “Problems of Enterprise Development:
Theory and Practice”****WAGES IN INSTITUTIONS OF SECONDARY GENERAL
EDUCATION OF RUSSIA: IDENTIFICATION OF FACTOR**

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Abstract

The paper studies the problems of wages on the example of two educational institutions in Kazan, based on a comparative analysis of the conditions in which the institutions work. Based on the analysis of the activities of the comprehensive school and the gymnasium, the main problems in financing and ensuring the quality of educational services were formulated. It is determined that an Autonomous institution is able to provide teachers with wage growth due to income from the provision of paid services, in contrast to the budget institution. The type of educational institution affects the amount of funding and the level of wages due to differences in funding standards. The article presents a two-factor model of the impact on wages of the teacher's labor intensity and the type of educational institution on the basis of data on 40 schools in Kazan. Based on the calculations found the following: the type of establishment, despite a moderate relationship with the dependent variable, is the factor significant growth of wages in the establishment; the workload of a teacher has a much smaller impact on wages at the establishment. Also, it is defined that as a result of growth of intensity of work in a gymnasium indicators of delivery of the uniform state examination (*hereinafter - the Exam*) worsen. On the basis of the conducted analysis the article defines the basic guidelines for educational institutions to increase efficiency and to bring salary level in line with the conditions of conducting of educational activity.

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Keywords: Wages, secondary general education, labor intensity, unified state exam.

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1. Introduction

Problems of identification of the factors influencing a salary of teachers of institutions of secondary school are investigated in different countries. Among the studies that have been published in the previous 5 years, the most attractive conclusions are in relation to the secondary education system in the United States and a number of African countries.

Specifically, Katz, Apfelbaum, Frank and Miles (2018) investigated the correlation between changes in per-pupil funding and changes in average teacher salaries in U.S. public elementary and secondary schools. Previously, similar studies have been conducted by Rickman, Wang and Winters (2015); Powers and Flint (2016); Taie and Goldring (2017). Mertler (2016) in the process of ranking the motivation factors of teachers of public and private schools of Arizona in the 2015-2016 school year, determined the significance of 18 factors, including teachers' salaries. Muguongo, Muguna and Muriithi (2015) assessed the impact of working conditions, basic pay and allowances on job satisfaction of 214 secondary school teachers in Kenya. A similar but more detailed study was conducted by Musili (2015) which assessed the role of motivating secondary school teachers in Kenya, such as promotion, wages, job security, working conditions and proximity to the workplace.

Nyamubi (2017) collected data from 8 secondary schools in 2 regions of Tanzania to determine factors affecting teacher job satisfaction. Based on the analysis, the above researcher concluded that teachers are satisfied with both monetary and non-monetary incentives, such as community support.

Of interest are the results of a study by Solangi, Qaisrani and Mughal (2015), which analyzed the job satisfaction level of 343 public secondary school teachers in Pakistan and identified factors leading to teacher dissatisfaction.

2. Problem Statement

Despite a certain contribution of the above-mentioned researches to development of methodology of identification of the factors influencing a salary of teachers of institutions of secondary General education, there is a deficiency of empirical researches in relation to features of the organization of system of financing of educational institutions in Russia. The above features include, in particular, fundamental differences in the system of financing of budgetary and Autonomous institutions.

3. Research Questions

For the purpose of research it is necessary to carry out the comparative analysis of activity of institutions of secondary General education in the city of Kazan. It is necessary to formulate a hypothesis about the most significant factors affecting the salaries of teachers of the studied schools. Empirically, it is necessary to assess the significance of the above factors. It is necessary to develop recommendations to the studied schools and municipal authorities that monitor the quality of educational services in institutions of secondary general education.

4. Purpose of the Study

The problems of ensuring the quality of education are always ultimately determined by the human factor. The quality of the budget service is influenced by the qualification, intensity of work, as well as the teacher's interest in the results of his work. In the educational sphere in recent years, there has been a tendency to increase the requirements for the professionalism of teachers, the number of reports and inspections has increased. The above is happening against the background of stagnant wage growth, as well as almost universal growth in the number of students per teacher. The above-mentioned trends indicate the brewing crisis of the profession and the need for a more detailed study of the problem of wages in educational institutions in order to further reform it. The purpose of the study is to assess the impact of various factors on the wages of public sector employees.

5. Research Methods

The basis of the study is an abstract logical method, methods of comparison and observation, as well as correlation and regression analysis. To assess the impact of the level of wages, two schools were selected- the municipal Autonomous educational institution "Comprehensive school No. 39 with in-depth study of English" (hereinafter-school "No. 39") and the municipal budgetary educational institution "Gymnasium No. 96" (hereinafter - school "No. 96") of the Vakhitovsky district of Kazan. Schools are comparable in terms of services, geographically located in the same area, which is very important for evaluation. The most significant differences in the activities of institutions are two aspects: a) the school "No. 39" is an Autonomous institution, and the school "No. 96" - a budgetary institution; b) institutions differ in type: comprehensive school and gymnasium. To build the model, performance indicators were collected and processed for 40 institutions of General education in Vakhitovsky and Privolzhsky districts of the city of Kazan (except for non-typical schools) at the end of the 2016/2017 academic year. The source of information was the ratings of schools on the results of the *Exam*, posted on the website of the Department of education of the city of Kazan, as well as information on each institution, posted on the official website for information on state (municipal) institutions.

6. Findings

The overall performance indicators of the institutions were examined to compare the data needed for the analysis (Table 01).

Table 01. Economic performance of the institutions studied

| Indicators | Years | | | Growth, % |
|--|----------|----------|----------|-----------|
| | 2014 | 2015 | 2016 | |
| School "No. 39" | | | | |
| Number of staff units at the end of the year | 181.6 | 201.39 | 207.85 | 14.45 |
| The average salary of employees, RUB | 27400.68 | 25994.43 | 25847.64 | -5.67 |
| Average annual number of students | 1271 | 1304 | 1335 | 5.03 |
| School "No. 96" | | | | |
| Number of staff units at the end of the year | 156.72 | 156.96 | 158.86 | 1.37 |
| The average salary of employees, RUB | 27302.8 | 26994.43 | 26733.26 | -2.09 |
| Average annual number of students | 1075 | 1111 | 1126 | 4.74 |

Source: authors based on (Official Site for Posting Information about State (Municipal) Institutions, 2017, 2018)

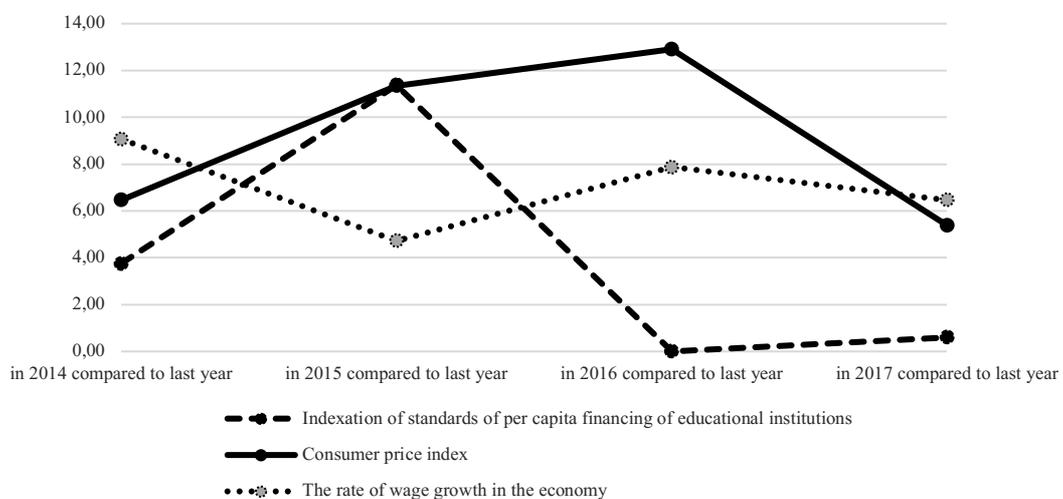
Analysis of the data shows that both institutions have increased the number of students. At the same time, the increase in the volume of services provided is accompanied by an increase in the number of staff. It should be noted that according to the data for 2017 in the school "No. 39" carried out the activities of 97 teaching staff, and in the school "No. 96" - 63 employees. Thus, at school "No. 39" the share of pedagogical workers makes 47 %, and at school "No. 96" - 40 %. As a result, the educational load per teacher in school "No. 96" is higher than in school "No. 39". The dynamics of the above indicators is accompanied by a decrease in the average wage for institutions. This is due, firstly, to a decrease in the share of persons with a qualification category, stricter requirements for employees to receive incentive payments, and secondly - with the lagging standards of financing of educational institutions from the real economic situation (Table 02).

Table 02. Per capita standards of financing of educational services in classes of comprehensive schools and gymnasiums, RUB

| Standards by type of school and level of education | Years | | | | |
|--|-------|-------|-------|-------|-------|
| | 2013 | 2014 | 2015 | 2016 | 2017 |
| Classes in comprehensive school | | | | | |
| Primary education | 18751 | 19437 | 21883 | 21883 | 22016 |
| Basic General education | 30270 | 31404 | 35025 | 35025 | 35239 |
| Secondary General education | 34156 | 35440 | 39469 | 39469 | 39710 |
| Classes in the gymnasium | | | | | |
| Primary education | 26924 | 27930 | 31199 | 31199 | 31389 |
| Basic General education | 36846 | 38231 | 42536 | 42536 | 42795 |
| Secondary General education | 41854 | 43432 | 48262 | 48262 | 48555 |

Source: authors.

Thus, in the period 2015-2016, the standards did not change, and the pace of economic growth in the remaining years significantly lagged behind the level of inflation achieved in the previous year. As a General rule, in the budgetary sphere, the indexation of expenditures is carried out on the basis of inflation values of the previous year (Figure 01).



Source: authors.

Figure 01. Increase in per capita funding of educational institutions, inflation and average wages in the Russian economy, %

The figures show that in the period 2014-2015 there was a relatively high level of indexation of standards, which corresponded to the inflation rate of the previous year. However, subsequently, the indexation was minimal-less than 1 %. It should be noted that, in 2018, the indexation in the primary school funding standards increased significantly – by 22 %, while basic and secondary General education were indexed within the inflation reached in 2017. The main share in the standards of financing is traditionally occupied by wages, so it is advisable to compare the standards with the growth of wages in the economy. The data in figure 1 also show that the growth rate of per capita standards is lagging behind that of average wages. Thus, despite inflationary processes, an increase in the number of students and the need to increase the staff of teachers, teachers' wages are growing slowly, and the level of real wages is characterized as a negative increase. The reduction of wages is due to the reduction of incentive payments. This is happening against the background of the growing burden on teachers. In school "No. 39" the average occupancy of classes was 28 children (48 classes). Therefore, the institution in compliance with the established normative ratio of the number of students per teaching rate (the norm is 25 people) is forced to organize work in two shifts. These factors have a negative impact on the quality of educational services. In school "No. 96" most teachers report that the duration of their work is more than 27 hours per week, while the standard is 18 hours. It is obvious that the excessive actual load of teachers negatively affects the results of their work. Exam performance of the School "No. 96" significantly deteriorated over the last academic year. At the same time, in such academic disciplines as "Informatics", "History", "Literature", "English language" and "social Studies", the result of the quality of the school was below the average level in the city of Kazan (Table 03).

Table 03. The average score of passing the Exam in schools "No. 96" and "No. 39", as well as in schools in Kazan and the Republic of Tatarstan in the 2016-2017 academic year

| Educational discipline | The average score of the Exam in school "No. 96» | The average score of the Exam in school "No. 39» | The average score of the Exam in schools of Kazan | The average score of the Exam in schools of the Republic of Tatarstan |
|-------------------------------|---|---|--|--|
| "Russian language" | 73.9 | 78.3 | 72.03 | 72.57 |
| "Mathematics" | 57.0 | 58.9 | 55.78 | 55.68 |
| "Informatics" | 69.0 | 75.8 | 70.23 | 67.73 |
| "Biology" | 62.6 | 57.6 | 58.40 | 59.18 |
| "Chemistry" | 65.0 | 58.7 | 63.32 | 63.19 |
| "Physics" | 60.0 | 62.4 | 56.96 | 56.70 |
| "History" | 52.0 | 52.3 | 57.97 | 59.36 |
| "Literature" | 56.0 | 64.0 | 64.16 | 64.35 |
| "English" | 66.9 | 80.3 | 77.02 | 75.43 |
| "Social studies" | 58.0 | 62.3 | 60.16 | 60.73 |
| "Russian language" | 73.9 | 78.3 | 72.03 | 72.57 |

Source: authors based on (E-education in the Republic of Tatarstan, 2018).

It should also be noted the reduction in the number of students who scored more than 80 points after passing the Exam. In 2015, there were 49 people, and in 2017-only 28. Comparison of indicators with the results of the Exam in the school "No. 39" indicates that the comprehensive school demonstrates higher

performance in most subjects, despite the status. At the same time in the school "No. 39" the number of graduates who passed the *Exam* for more than 80 points was 79 people. In total, according to the *Exams* passed at school "No. 96", the share of such graduates is 11.2 % of the total number of graduates, and at school "№ 39" – 19,3 %. The presented data indicate that the optimization of labor costs in the school "No. 96" leads to a deterioration in the performance of the institution. Based on the presented data, the problem of the employer's impact on wages is relevant. Reserves to change the negative trend to reduce the salaries of teachers, to the deterioration of the quality indicators of institutions, to a steady excess load on teachers should be sought within the framework of the opportunities that provide the heads of institutions of the current legislation. In order to develop recommendations for the activities of educational institutions, the authors decided to build a correlation matrix to determine the relationship between groups of variables. On the basis of reports on institutions and the results of the *Exam* in 2016/2017 academic year, a matrix of dependence between variables was formed (Table 04).

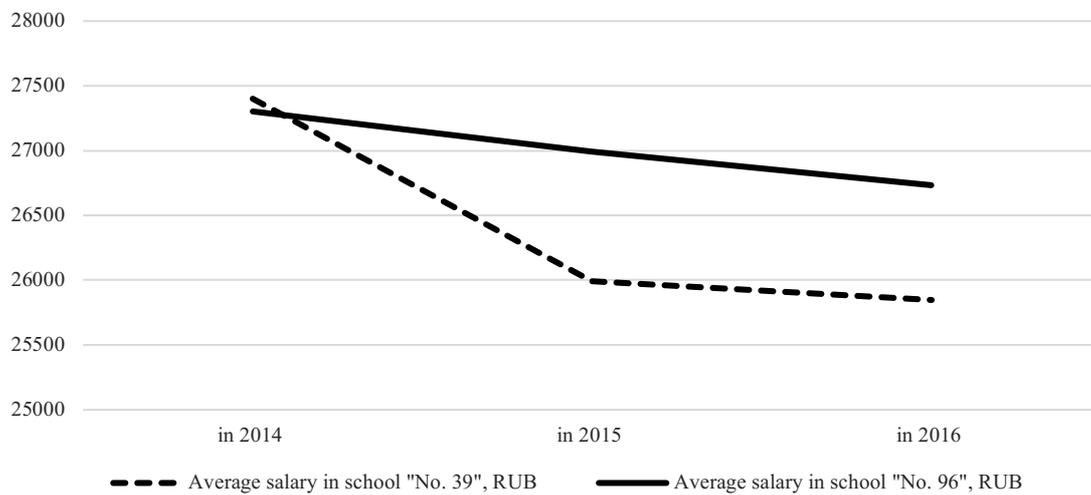
Table 04. Correlation matrix of performance indicators of 40 schools of Vakhitovsky and Privolzhsky districts of Kazan city

| Indicators | The Exam on the discipline "Russian language" | The Exam on the discipline "Mathematics" | Average salary | Number of students | Number of teachers | Load per teacher | Type of educational institution |
|---|---|--|----------------|--------------------|--------------------|------------------|---------------------------------|
| The Exam on the discipline "Russian language" | 1 | | | | | | |
| The Exam on the discipline "Mathematics" | 0.509 | 1 | | | | | |
| Average salary | 0.472 | 0.389 | 1 | | | | |
| Number of students | 0.461 | 0.373 | 0.689 | 1 | | | |
| Number of teachers | 0.464 | 0.325 | 0.656 | 0.945 | 1 | | |
| Load per teacher | 0.246 | 0.311 | 0.409 | 0.589 | 0.317 | 1 | |
| Type of educational institution | 0.374 | 0.211 | 0.285 | 0.436 | 0.493 | 0.145 | 1 |

Source: authors.

Based on the data of correlation analysis, it can be concluded that the results of the *Exam* in the Russian language have the greatest impact on the number of students and teachers in the institution, as well as the level of wages. To a lesser extent, this effect is noticeable on the results of the *Exam* in mathematics. These results to some extent characterize the need for a more individual approach to learning, since the high level of load on one teacher affects his ability to work with each student. The highest rates of dependence between variables are observed in the analysis of the impact on the average salary of the number of students and teachers. The dependence is quite obvious, but below the level of functional dependence. The analysis of the two schools discussed above showed that the increase in the number of students is accompanied by an increase in the number of teachers, but their growth rates do not coincide. At the same

time, the average salary in both institutions decreased, despite the increase in the burden on teachers. This trend is especially noticeable in the school "No. 96", which is a budgetary institution, since the level of load per teacher in the institution exceeds 17 people. It is also necessary to pay attention to the weak dependence of the average wage on the type of institution - comprehensive school, gymnasium or Lyceum. This situation also raises a lot of questions, because the type of educational institution should directly affect the level of qualification of teachers, and therefore-and the level of remuneration. The absence of such dependence indicates a biased assessment of the work of teachers. However, it should be remembered that the cost standard for pupils of gymnasium and Lyceum classes is 20-30 % higher than the standard for comprehensive schools (see Table 02). The standard includes additional provision of literature, as well as salaries of staff of higher qualification level, including the cost of improving their skills. At the same time, the analysis shows that the school "No. 96", which receives more funding, is characterized by almost the same level of remuneration as the school "No. 39" (Figure 02).



Source: authors.

Figure 02. Average salary in schools "No. 39" & "No. 96" in 2014-2016, RUB

However, in this situation, it should be borne in mind that the school "No. 39" as an Autonomous institution more actively uses the provision of paid services and directs part of the funds to pay their employees. At the same time, the difference in wages does not exceed 1000 RUB. This situation is due to the current procedure for the formation of wages, providing for the establishment of allowances for the qualification category from 7.5 to 15 %. At the same time, teachers in gymnasiums have much higher work intensity, since more complex programs are mastered, it is necessary to show high results at competitions and Olympiads. On the basis of the results of the correlation analysis, a decision was made to test the hypothesis of the impact on teachers' salaries of two factors: the level of load on teachers and the type of educational institution. Despite the more obvious dependence of wages on the number of pupils, we believe that even if there is a weaker correlation between the variables, their relationship is important for the development of recommendations. Thus, it was decided to build a two-factor model:

$$Y = a_0 + a_1x_1 + a_2x_2$$

where: x_1 – the level of load on one teacher (the ratio of the number of students and the number of teachers);

x2 - the type of institution.

To adapt to the mathematical description, the types of institutions were reflected in the form of a number: «0» - comprehensive school, «1» - school with in-depth study of individual subjects, «2» - gymnasium, «3» - Lyceum. The logic of assigning a digital value is determined by the level of complexity of educational programs in ascending order. As a result, the following values of regression and variance analysis were obtained (Table 05).

Table 05. The results of the regression analysis

| Indicators | value of indicator | |
|---|--------------------|------------------|
| number of observations | 40 | |
| Multiple coefficient of determination (R) | 0,558329 | |
| Correlation coefficient (R ²) | 0,311731 | |
| F-test | 0,000997 | |
| Coefficients | | Probability test |
| Y-intersection | 15320,53 | 0,000207 |
| Variable X ₁ | 612,8074 | 0,038156 |
| Variable X ₂ | 1639,071 | 0,008378 |

Source: authors.

Based on the results of the regression analysis, the equation takes the form:

$$Y = 15320.53 + 612.8074x_1 + 1639.071x_2$$

The results of the constructed equation can be interpreted as follows: with an increase in the load on the teacher per student, the salary increases by 612 RUB per month. The type of institution has a more significant impact on the level of remuneration: the higher the status of the institution, the higher the salary. For example, the discrepancy in wages in comprehensive schools and schools with in-depth study of certain academic disciplines is 1639 RUB. Consequently, the highest level of remuneration is typical for teachers of the Lyceum. To assess the quality of the equation, consider the indicators of regression statistics and variance analysis. First of all, the multiple coefficient of determination (R) demonstrates the relationship between all variables. In our case, it is 0.558, characterizing the average level of communication. The coefficient of determination (R²) characterizes a moderate relationship between the dependent and independent variables on the Chaddock scale (in the range from 0.3 to 0.5). It explains what percentage of the dependent variable is explained through the independents. Based on the results obtained, it can be concluded that the remuneration of 31 % is explained through the level of load on teachers and the type of educational institution. Despite the relatively low rate, it should be borne in mind that remuneration in the public sector is directly regulated by law, so it is extremely difficult to identify factors that can affect the institution or founder. The possibility of differentiation of wages depending on the selected independent variables, in our opinion, is a tool of influence of the founder on the system of financial incentives in subordinate institutions. The F-test, or evaluation of the equation on the Fisher criterion shows the reliability of the resulting regression equation. The lower the value, the better. Normally taken equal to 0.05 or 0.01. In our case, the significance of F is 0.0009, therefore, the model is statistically significant, and the constructed equation is reliable. Also, regression analysis allows us to estimate the coefficients of the regression equation. To do this, the coefficients are evaluated for the probability of a null hypothesis (P-

test). It shows the significance of the calculated student criterion. The lower the value, the better, because the probability that the criteria are not different (null hypothesis) is rejected. A P-value of less than 0.05 is considered acceptable. In our equation, all calculated coefficients have a value below the critical value, which indicates their statistical significance. Based on the analysis, we can conclude that the constructed equation is reliable and reflects the statistically significant dependence of remuneration in the institution on its type and level of load on teachers.

Based on the constructed model, as well as the results of the analysis of the two educational institutions, we can conclude that:

a) An important condition for increasing wages in the institution is its belonging to a certain type of institution - school, gymnasium or Lyceum;

b) An increase in the number of students per teacher leads to an increase in wages;

c) At comparable levels of qualification of personnel in institutions (at school "No. 39" - 70 %, at school "No. 96" - 75 % have the highest or first qualification category), remuneration at school "No. 96" is slightly higher;

d) The level of qualification of teachers and its appearance do not affect the performance of the institution, because the school "No. 39," which refers to a category of schools with profound studying of separate disciplines ("English"), shows on average a higher level of training and is included in the TOP 100 schools of the Republic of Tatarstan, and the school "No. 96" does not demonstrate a high level of training of students. Perhaps the reason is the lower level of tension of teachers - 13 people against 17 in school "No. 96".

From this we can formulate the following recommendations concerning the regulation of remuneration and its compliance with the quality level of education:

a) School "No. 39" it is necessary to review the personnel policy, since the growth rate of the number of staff in the institution exceeds the growth rate of the number of students;

b) School "No. 39" traditionally demonstrates high levels of learning and high level of staff, and in addition, in the framework of granting autonomy demonstrates sufficient economic efficiency. So it makes sense to discuss with the founder give the school the status of school with the preservation of Humanities institutions;

c) School "No. 96" it is necessary to revise the system of incentives for employees of companies, because the quality indicators (results of the *Exam* average, and the level of wages in the establishment are above average in the district (26773 vs 25450 RUB the area). At the same time, school "No. 39" in the ranking of schools at the end of 2017 takes 5th place in the group of schools with in-depth study of individual subjects with a score of 101 (the better the less), and in the school "No. 96" - 29th place among gymnasiums and lyceums with a score of 219. The study shows that the indicators of the institution are deteriorating over the past years, so to change the situation, the institution needs to introduce more systematic mechanisms to encourage teachers to improve the level of training of students;

d) School "No. 96" also needs to optimize the number of staff and the ratio of the number of pedagogical and administrative workers, since currently the teaching staff is only 40 % of the staff. The institution needs to increase the number of teaching staff to form a better training of students and reduce

the level of load on teachers (in the school " No.96" the load on the teacher is 17 people with an average of 13 in the district).

7. Conclusion

In general, in our opinion, the results of the study can be of practical importance for assessing the activities of any school in any region of Russia. However, the most comprehensive view of the situation in an educational institution can only give a comparative analysis. The Department of education at the local level also makes sense to use the methodology proposed by the authors, since the assignment of the school the status of a gymnasium or Lyceum should be scientifically justified. In the context of severe budgetary constraints, the increase in funding standards should be accompanied by a qualitative analysis of the activities of institutions and the quality of their performance.

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