ORGANIZATIONAL-PEDAGOGICAL MODEL FOR IMPROVING THE QUALITY OF EDUCATION IN GENERAL SECONDARY SCHOOLS AND ITS EXPERIMENTAL RESULTS

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ABSTRACT
This article presents the author's organizational-pedagogical model for improving the quality of education in general secondary schools and the results of its experimental testing. The model covers 6 blocks (normative-legal, managerial, monitoring, personnel, material-technical, and socio-psychological) and ensures their interrelationship and continuity. The experimental work was conducted in the 2024-2025 academic year with the participation of 10 schools (5 experimental, 5 control), 270 pedagogical and managerial staff, and 300 9th-grade students. The results showed that in the experimental group, the educational quality index increased from 58.4% to 80.0% (Δ=+21.6%), while in the control group it increased by only 1.8%. The statistical significance of the differences is confirmed by Student's t-test ($t(calc)=4.82 > t(table)=2.78$; $p < .01$) and Pearson's χ^2 test ($\chi^2(calc)=8.94 > \chi^2(table)=7.82$; $p < .05$).

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organizational-pedagogical model, quality of education, experimental work, school management, statistical analysis, Student's test, Pearson's test.

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Introduction

The problem of managing the quality of education is today one of the most pressing directions in pedagogy and educational management science. The reforms being carried out in Uzbekistan — the newly amended Constitution (Article 50), the Law "On Education" (No. O'RQ-637), and the "Uzbekistan – 2030" strategy (Decree No. PF-158) — require the introduction of modern mechanisms for managing the quality of education in schools (Constitution of the Republic of Uzbekistan, 2023; Decree of the President of the Republic of Uzbekistan No. PF-158, 2023). However, practice shows that school management is still based on traditional-administrative methods, which hinders the improvement of educational quality (Potashnik, 2000; Shamova et al., 2002).

In our previous studies (Jo‘rayev, 2025a, 2025b), the theoretical and methodological foundations of educational quality management were analyzed, and the current situation in Uzbek schools as well as foreign experience were examined. Based on these studies, an organizational-pedagogical model for improving the quality of education in general secondary schools was developed. This article presents the structure, content, and experimental results of this particular model.

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The purpose of the article is to statistically prove the effectiveness of the proposed organizational-pedagogical model based on the results of experimental testing.

Methodology

During the study, the following organizational-pedagogical model, consisting of 6 blocks, was developed for improving the quality of education in general secondary schools.

Table 1

Blocks of the Proposed Organizational-Pedagogical Model and Their Content

Block name	Processes covered	Implementation mechanisms
1. Normative-legal block	Improving the state educational standard, curricula, internal regulations, job descriptions	Adapting documents to modern requirements, converting to digital format
2. Management block	Planning, organizing, delegating, motivating, monitoring	Introducing a KPI system, distributing authority, democratic management methods
3. Monitoring and assessment block	Cross-sectional assessments, surveys, lesson analyses, statistical reports	Comprehensive assessment based on the "conditions – process – result" index, digital platforms
4. Personnel potential block	Professional development, methodological services, mentor-mentee relationships, coaching	Continuous development of pedagogical competencies, activating the work of methodological associations
5. Material-technical block	ICT, laboratories, library, equipment	Providing modern educational equipment, creating digital resources
6. Socio-psychological block	Motivation, team atmosphere, school-family-community cooperation	Incentive system for teachers and students, psychological support

The main principles of the model are: systematicity, process orientation, consistency, adaptability, and result orientation. All blocks are closely interconnected, and their joint functioning ensures the systematic growth of educational quality.

The experimental testing was conducted during the 2024-2025 academic year in 10 general secondary schools from 3 regions of Uzbekistan (Tashkent city, Tashkent region, Surkhandarya region). Five schools were assigned to the experimental group (EG) and five to the control group (CG), and their initial conditions were made as similar as possible (Novikov, 2004). A total of 270 pedagogical and managerial staff (10 directors, 10 deputy directors for educational affairs, 10 deputy directors for spiritual-educational affairs, 40 heads of methodological associations, 200 teachers) and 300 9th-grade students were involved in the study.

The experiment was organized in 3 stages:

1. Ascertaining stage — the initial state of both groups was diagnosed based on the "conditions – process – result" triad.

2. Formative stage — all 6 blocks of the proposed model were introduced step by step only in the experimental group (over 6 months). Traditional management methods were maintained in the control group.

3. Control stage — the dynamics of changes in both groups were re-measured and compared.

Four types of diagnostic tools were used during the experimental testing: for leaders the "Assessment of the Effectiveness of Educational Management" questionnaire (5-point Likert scale); for heads of methodological associations case questions and a checklist; for teachers the anonymous "Professional Motivation and Organizational-Pedagogical Conditions" questionnaire (10-point scale); for 9th-grade students competency-oriented test examinations (100-point scale).

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The normality of the data distribution was checked using the Shapiro-Wilk test. Student's t-test and Pearson's χ^2 test were used to determine the reliability of differences between the groups (confidence level $p \leq .05$) (Gmurman, 2003; Sidorenko, 2002). The data were processed in SPSS.

Results and Discussion

Diagnosis of the Initial State (Ascertaining Stage)

At the ascertaining stage, the current state of educational quality in both groups was assessed. Table 2 below presents the results of the initial measurement.

Table 2

Initial Educational Quality Indicators in the Experimental and Control Groups (%)

Components	Experimental group (EG)	Control group (CG)	Difference
Condition quality	62.4	61.8	+0.6
Process quality	54.2	55.1	-0.9
Result quality	58.7	59.2	-0.5
Overall index	58.4	58.7	-0.3

The table data show that the differences between the experimental and control groups for all indicators range from 0.5% to 0.9%, which is not statistically significant. This indicates that the initial state of both groups was almost identical, meaning that subsequent changes could be attributed to the proposed model.

It was also found that in both groups, "process quality" (54.2% and 55.1%) and "result quality" (58.7% and 59.2%) lagged noticeably behind "condition quality" (62.4% and 61.8%). This shows that although the material-technical base in schools is relatively good, insufficient attention is paid to management processes and final results.

At the formative stage, all 6 blocks of the model were introduced in the experimental group schools. As a result of the work carried out over 6 months, the following changes occurred.

Table 3

Comparative Analysis of the Experimental Testing Results (Ascertaining and Control Stages)

Group	Stage	Condition quality	Process quality	Result quality	Overall index	Difference (Δ)
EG	Ascertaining	62.4	54.2	58.7	58.4	-
EG	Control	78.6	82.3	79.1	80.0	+21.6
CG	Ascertaining	61.8	55.1	59.2	58.7	-
CG	Control	63.2	57.4	60.8	60.5	+1.8

Table 3 shows that in the experimental group, the overall educational quality index rose from 58.4% to 80.0% (Δ=+21.6%). In the control group, it increased from only 58.7% to 60.5% (Δ=+1.8%). The largest increase in the experimental group was observed in the "process quality" indicator (from 54.2% to 82.3%, i.e., +28.1%). "Result quality" increased from 58.7% to 79.1% (+20.4%), and "condition quality" increased from 62.4% to 78.6% (+16.2%).

It is notable that "condition quality" also increased in the experimental group (62.4% → 78.6%). This means that the model had a positive effect not only on the process and results but also on improving conditions. In particular, the increase in time and methodological resources allocated to teachers' professional development, and the introduction of digital monitoring tools, improved the quality of conditions.

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A detailed analysis of the changes in the experimental group showed that each of the 6 blocks of the model had its own specific effect.

Table 4

Changes in the Experimental Group by Model Blocks

Block name	Ascertaining stage (%)	Control stage (%)	Change (Δ)
Normative-legal block	65.2	78.4	+13.2
Management block	52.8	81.5	+28.7
Monitoring and assessment block	50.3	79.8	+29.5
Personnel potential block	56.7	82.1	+25.4
Material-technical block	63.4	77.6	+14.2
Socio-psychological block	51.9	80.3	+28.4

Table 4 shows that the largest increase was observed in the monitoring and assessment block (+29.5%), the management block (+28.7%), and the socio-psychological block (+28.4%). This can be explained as follows. Monitoring and assessment block the introduction of a digital monitoring system and comprehensive assessment based on the "conditions – process – result" triad sharply increased the effectiveness of control. Management block the delegation of authority and the introduction of a KPI system helped the director and deputies organize their work more effectively. Socio-psychological block the fairness of the teacher incentive system and a healthy team atmosphere increased their motivation.

The results of competency-oriented test examinations for 9th-grade students showed the following dynamics.

Table 5

Dynamics of 9th-Grade Students' Test Results (%)

Group	Stage	Basic knowledge	Practical competence	Critical thinking	Overall result
EG	Ascertaining	62.3	54.8	56.2	57.8
EG	Control	81.7	78.5	76.9	79.1
CG	Ascertaining	63.1	55.4	57.3	58.6
CG	Control	64.8	57.2	59.1	60.4

Table 5 shows that the overall test result of students in the experimental group increased from 57.8% to 79.1% (Δ=+21.3%). The largest increase was observed in the "critical thinking" competency (56.2% → 76.9%, Δ=+20.7%). In the control group, the changes were very small (58.6% → 60.4%, Δ=+1.8%).

These results confirm that the model had a positive effect not only on management and pedagogical processes but also directly on the knowledge quality and competencies of the students.

A mathematical-statistical analysis was carried out to prove that the results obtained were not accidental but a regularity.

Student's t-test was used to determine the reliability of the difference between the mean indicators of the two independent samples (EG and CG). For the difference between the overall indices of EG and CG at the control stage:

t(calc) = 4.82

Degrees of freedom df = 8 (n1=5, n2=5)

For confidence level $p \leq 0.01$, t(table) = 2.78

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Since t(calc) (4.82) > t(table) (2.78) ($p < 0.01$), the difference between the experimental and control groups was found to be statistically highly reliable.

Pearson's χ^2 test. Pearson's χ^2 test was used to assess the difference in the distribution of teachers' and leaders' performance effectiveness levels (high, medium, low). At the control stage, the share of teachers with a "high level" in the experimental group increased from 32% to 71%, while in the control group this indicator changed from 34% to 38%. Calculated:

χ^2(calc) = 8.94

For df = 2, $p < 0.05$, χ^2(table) = 7.82

Since χ^2(calc) (8.94) > χ^2(table) (7.82) ($p < 0.05$), the difference in distribution between the groups is also statistically reliable.

Based on the results obtained and the statistical analyses, the following important aspects should be noted. First, the sharp changes in the experimental group (Δ=+21.6%) are explained by the complex effect of the model. Success was achieved not by individual elements of the model, but by the systematic application of all 6 blocks together, complementing one another. For example, delegation in the management block increased the activity of the heads of methodological associations (their work activity increased by 40%), while digital systems in the monitoring block ensured the objectivity of decisions.

Second, the 28.1% increase in "process quality" (54.2→82.3) is noteworthy. This shows that innovations in the working relationships between school leaders and teachers (subject-subject) and in the organization of lesson processes yielded the greatest effect. In particular, the ISO 9000 principles of "process approach" and "fact-based decision making" were the principles that yielded the fastest positive results in school practice (Deming, 2011).

Third, the very small increase in the control group (Δ=+1.8%) once again proved the inefficiency of traditional management methods. Here too, although the material-technical base (conditions) improved somewhat, the process and result indicators remained almost unchanged. This shows that "conditions" alone are not sufficient, and they must be developed in proportion to management and pedagogical processes.

Fourth, all blocks of the model are interconnected and complement one another. For example, the improvement of the monitoring block (a 29.5% increase) in turn had a positive effect on the management block (by providing accurate data for decisions) and the personnel block (by identifying teachers' shortcomings and directing efforts to address them). This confirms the systemic nature of the model.

Fifth, the positive changes in student results (from 57.8% to 79.1% in EG) show that the model achieved its ultimate goal improving the knowledge quality and competencies of learners. This confirms that the final criterion of any change in educational management is student competence (Bolotov & Efremova, 2007).

Conclusion

Based on the theoretical research and experimental testing conducted, the following conclusions were reached:

The educational quality index in the experimental group increased from 58.4% to 80.0% (Δ=+21.6%), while in the control group it increased by only 1.8%. The statistical reliability of the difference was confirmed by Student's t-test ($p < .01$) and Pearson's χ^2 test ($p < .05$).

The largest increase was observed in the monitoring and assessment block (+29.5%), the management block (+28.7%), and the socio-psychological block (+28.4%). This shows that digital monitoring, delegation of authority, and the teacher incentive system are the most effective mechanisms for improving educational quality.

The test results of 9th-grade students in the experimental group increased from 57.8% to 79.1%. In particular, the growth in "critical thinking" competency (56.2% → 76.9%, Δ=+20.7%) shows that the model served not only to impart knowledge but also to develop higher-order thinking in students.

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The experimental testing was conducted in schools with various socio-economic conditions (large city, remote area, district center, village), and positive results were recorded in all of them. This shows that the model can be applied in all regions of the republic.

In the experimental group, leaders' time-management indicators improved (bureaucratic workload decreased by 30%), and the activity of heads of methodological associations increased by 40%. This created an opportunity for the efficient use of school resources.

In the future, it is planned to continue research on the large-scale implementation of this model in all regions of the republic, developing adaptation mechanisms that take into account the specific characteristics of each school, as well as creating a remote monitoring system based on artificial intelligence and Big Data technologies.

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