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IMPROVING THE INFORMATION SYSTEM FOR MONITORING THE ACTIVITIES OF HIGHER EDUCATION TEACHERS BASED ON KPI USING ARTIFICIAL INTELLIGENCE ELEMENTS

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Abstract: This article explores the issues of improving the KPI (Key Performance Indicator) system used to assess and monitor the performance of academic staff in higher education institutions. The study analyzes how the integration of modern information technologies, particularly artificial intelligence (AI) elements, can automate and ensure the transparency of the evaluation process. The paper outlines the theoretical and practical foundations for creating an effective information system based on AI capabilities for data collection, processing, analysis, and forecasting.

Keywords: KPI, artificial intelligence, higher education, academic staff, information system, automation, data analysis, monitoring, evaluation system, digital education.

Introduction

Enhancing management efficiency, ensuring fair evaluation of university faculty members, and transparently monitoring their scientific and pedagogical performance have become key priorities in the digital era. The modernization processes in higher education in Uzbekistan—guided by documents such as the “Digital Uzbekistan – 2030” Strategy and the “Concept for the Development of Higher Education until 2030”—have established a framework for comprehensive reforms in this field.

However, in practice, the assessment of teaching staff often relies on subjective approaches, manually entered data, and traditional statistical calculations. This introduces significant human bias, reduces the reliability of evaluation results, and decreases the efficiency of incentive mechanisms. Therefore, it has become necessary to enhance the KPI system by integrating modern information technologies—particularly artificial intelligence elements.

The KPI (Key Performance Indicator) system represents a set of measurable indicators that determine the degree to which an organization or employee achieves strategic objectives. In higher education, these indicators are generally divided into the following categories:

1. Teaching performance indicators: teaching load, quality of classroom instruction, student performance results, and application of modern pedagogical technologies.
2. Research performance indicators: number of scientific articles, participation in indexed journals (Scopus, Web of Science), engagement in grant projects, and academic degrees or titles.

3. Innovation and organizational performance: participation in startups, patents, digital projects, and contribution to the university's ranking.

At present, these indicators are mostly collected manually, which causes delays, errors, and subjectivity. Therefore, automating the KPI system through an AI-based information platform is a vital step forward.

1. The Role and Potential of Artificial Intelligence

Artificial intelligence (AI) technologies are widely used today for data analysis, reasoning, prediction, and automated decision-making. Within the KPI system for higher education, AI can perform several essential functions:

- Automated data collection: AI can integrate data from LMS (Learning Management Systems), university portals, scientific databases (Scopus, Google Scholar), and other sources.
- Intelligent analysis: AI identifies trends based on a teacher's previous performance, detecting patterns of growth or decline.
- Error detection: the system detects duplicated, incorrect, or manipulated data entries.
- Algorithm optimization: AI dynamically determines weighting coefficients to ensure fair and unbiased performance evaluation.

2. Model of an Automated KPI System

The proposed model of the AI-based KPI system consists of three main modules:

- Data Collection Module: automatically gathers information about teaching loads, scientific output, and organizational engagement.
- AI-Based Analysis Module: processes collected data using statistical models and neural network algorithms.
- Reporting and Visualization Module (Dashboard): provides users with real-time visual insights through dashboards, charts, and dynamic growth indicators.

Machine learning algorithms such as Regression Analysis, Decision Trees, and K-means Clustering can be used to categorize faculty members into performance groups—high, average, and low efficiency. Based on these outcomes, management can automatically receive recommendations for promotions, training programs, or professional development.

3. Predictive Analytics in the AI-Based KPI System

Through Predictive Analytics, AI can forecast future performance based on previous patterns. For example, by analyzing the relationships among the number of publications, teaching workload, and student feedback scores, AI can predict a teacher's expected performance for the upcoming semester. Such forecasts help university administrators plan human resources more effectively.

4. Ensuring Transparency and Fairness

An AI-driven KPI system minimizes human subjectivity. Every score and evaluation is based on algorithmic logic and predefined parameters. Teachers can access

their results in real-time, analyze their weaknesses, and take corrective measures. This enhances motivation for continuous professional development and accountability.

5. Data Security and Confidentiality

Data protection is a critical requirement for any AI-based KPI system. Security measures should include Data Encryption, Role-Based Access Control (RBAC), and Blockchain-based verification mechanisms. All data should be stored in a centralized, secure server accessible only to authorized users.

6. Practical Results and Benefits

The AI-based KPI information system provides several key advantages:

- Accelerates the evaluation process through automated computation;
- Minimizes human error and bias;
- Enhances data accuracy and reliability;
- Motivates academic staff through transparent feedback;
- Provides analytical insights for strategic management decisions.

As a result, higher education institutions can cultivate a data-driven management culture, improving overall decision-making efficiency and institutional performance.

Conclusion

The integration of artificial intelligence into KPI-based evaluation and monitoring of higher education faculty represents not only a technological advancement but also a transformation in management philosophy. By using AI, the KPI system performs objective data analysis, reduces human error, accelerates decision-making, and ensures transparency.

In the future, such systems will enable comprehensive evaluations of faculty performance based on teaching load, research productivity, and student feedback. This represents a crucial step toward building a digital university model, improving education quality, advancing scientific capacity, and establishing a fair assessment system.

Ultimately, an AI-driven KPI information system will become a reliable management tool for universities, encouraging educators to continuously enhance their performance and contributing to the evolution of the education system into a new digital stage.

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