Krasniuk S., senior lecturer
Kyiv National University of Technologies and Design (Kyiv, Ukraine)

KDD & KNOWLEDGE MANAGEMENT SYSTEMS IN CRISIS MANAGEMENT OF EDUCATION

Introduction

The modern education system is in a state of active transformation under the influence of digitalization, globalization and increasing demands for the quality of personnel training. One of the key factors contributing to this transformation are cognitive and intelligent technologies focused on working with knowledge [1]. Their integration into education management processes allows to increase the efficiency of decision-making, ensure the adaptability of educational trajectories, and optimize the activities of educational institutions in the conditions of high variability of the external environment.

Cognitive technologies based on models of human thinking and perception [2] and intelligent technologies based on the methods of artificial intelligence and machine learning [3] form the basis of a new management paradigm in which knowledge becomes not only a result, but also a management tool. In the context of the transition to a knowledge economy and the rapid development of information systems, the importance of approaches focused on the analysis, interpretation and use of knowledge as a strategic resource is increasing [4, c. 349-357]. This work is aimed at identifying the features of the application of cognitive and intelligent technologies in the management of modern education, as well as determining the prospects for their further development.

Main Part

The current challenges that the education system faces in the context of global and local crises require a transition from static management models to adaptive management systems capable of functioning effectively in conditions of uncertainty and rapidly changing circumstances [5, c. 4-16]. In this context, a

new enhanced role should be taken on by the hybrid concept, a hybrid approach that combines both KDD (Knowledge Discovery in Databases) methods and Knowledge Management (KM) technology – as the holistic concept, methodology for extracting, structuring, distributing and applying knowledge in order to increase the sustainability of educational systems.

In addition, in conditions of constant instability and multiple crises – economic, epidemiological, social - the education system is faced with the need to make management decisions based on accurate, comprehensive and timely analytical data [6, c. 119-124]. In this regard, a lower, deeper level of hybridization is of particular importance – hybridization of the KDD methods/algorithms themselves, as a direction that ensures the sustainability and adaptability of educational systems in anti-crisis conditions.

KDD technology is a complex data mining process aimed at automatically discovering previously unknown but practically significant knowledge extracted from educational information arrays. It includes the stages of data pre-processing, feature selection and transformation, application of Data Mining methods and interpretation of results. KDD as an interdisciplinary field combines methods of exploratory data visualization (EDA), statistical analysis, classical and neural network [7] machine learning, mathematical modeling [8, c. 100-106] and the theory of complex systems control. Hybridization in this context implies the integration of various analytical and computational approaches within a single model, which allows not only to enrich the quality of analysis, but also to expand the possibilities of crisis management.

Knowledge management (KM), in turn, is aimed at systematization, dissemination and application of both formalized (explicit) and informal (tacit) knowledge available to an educational organization.

It is the multi-level and multi-factor hybridization of these two approaches (KDD & KM) that allows not only to identify and analyze critical information [9, c. 194-211], but also to implement it in decision-making processes and organizational learning [10, c. 211-212].

Key areas of application of hybrid technologies of KDD and Knowledge Management in anti-crisis educational management include:

1) Crisis diagnostics and risk knowledge base formation. KDD allows to identify hidden patterns in educational data (e.g. changes in student engagement, decline in the quality of the educational process, failures in the digital infrastructure), while KM ensures the formalization of this knowledge and its inclusion in crisis response systems.

2) Analytical and predictive support for management decisions. The synergy of KDD and KM allows to identify hidden patterns in large volumes of educational data, interpret them in the context of current problems and transform them into management knowledge applicable for strategic and operational planning.

3) Formation of a database of adaptive response scenarios. Based on the identified patterns and cases, knowledge repositories are created containing proven crisis response strategies, which increases the speed and efficiency of decision-making.

4) Ensuring institutional memory and continuity. Knowledge management technologies help preserve and transmit critical organizational experience accumulated in times of crisis, which reduces the risk of repeating mistakes and accelerates adaptation processes.

5) Personalized management of educational trajectories. Integration of KDD with intelligent recommendation systems allows taking into account the individual needs of students, adjusting curricula in real time and minimizing the negative impact of crisis factors on the quality of education.

6) Creating self-learning management systems. The combination of knowledge extraction from data with feedback from users forms a dynamic management system capable of self-organization and continuous improvement of management mechanisms.

Conclusions

Successful implementation of hybrid KDD and Knowledge Management

technologies in the field of adaptive education management requires a comprehensive digital and organizational infrastructure: access to high-quality data, knowledge support at all management levels, an interdisciplinary team of specialists, as well as ethical and legal regulations for the use of educational data and knowledge.

Thus, hybrid KDD and Knowledge Management technologies are becoming a key element in the formation of an intelligent and adaptive model of modern education management. Their use allows increasing the sustainability of the educational system, promptly responding to environmental challenges and creating conditions for continuous organizational development even in conditions of instability and crises.

Consequently, the hybridization of KDD and Knowledge Management in adaptive education management forms an intelligent architecture of anti-crisis response, in which data is transformed into management resources, and knowledge is transformed into a strategic asset. This ensures the sustainability, flexibility and intellectual viability of the education system in a rapidly changing and unstable environment.

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