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MODERN TEACHING METHODOLOGIES IN TECHNICAL COLLEGES: PRACTICE-ORIENTED AND DIGITAL APPROACHES

Zaurbekov M.N., Serikbay K.E., Sultanbek A.T., Mutalieva A.K., Mamykova A.D.

M. Utebayev Higher College of New Technologies, Shymkent, Kazakhstan

Abstract: This article examines modern teaching methodologies applied in technical colleges, focusing on practice-oriented learning and digital technologies. The study highlights the importance of integrating theoretical knowledge with practical skills to prepare students for real-world professional activities. Special attention is given to interactive teaching methods, project-based learning, and the use of digital tools in the educational process. The results demonstrate that the implementation of innovative approaches significantly improves students' engagement and learning outcomes.

Keywords: *teaching methodology, technical education, college, digital learning, practice-oriented education, project-based learning*

Introduction

Modern education is undergoing rapid transformation driven by technological progress, globalization, and the changing requirements of the labor market. In this context, technical and vocational education institutions play a crucial role in preparing qualified specialists capable of adapting to dynamic industrial environments.

The traditional model of education, which is mainly based on the transfer of theoretical knowledge through lectures, is no longer sufficient to meet the needs of modern society. Employers increasingly require graduates who possess not only theoretical understanding but also practical skills, critical thinking, and the ability to solve real-world problems. This creates a need for new teaching methodologies that focus on competency-based education and practical training.

Technical colleges, such as M. Utebayev Higher College of New Technologies, are at the forefront of this transformation. They serve as a bridge between education and industry, ensuring that students acquire professional skills relevant to current technological and economic conditions. Therefore, the effectiveness of teaching methodologies directly influences the quality of training and employability of graduates.

One of the key directions in modern education is the integration of practice-oriented learning. This approach emphasizes the application of theoretical knowledge in real or simulated professional situations. It includes laboratory work, internships, project activities, and collaboration with industry partners. Such methods help students develop professional competencies and better understand their future roles in the workplace.

Another important trend is the widespread use of digital technologies in education. Digital tools, including online platforms, virtual laboratories, and simulation software, provide new opportunities for interactive and flexible learning. They allow educators to personalize the learning process, monitor student progress, and enhance engagement. Moreover, digitalization supports blended and distance learning, which has become especially relevant in recent years.

However, the implementation of modern teaching methodologies is associated with certain challenges. These include insufficient technical infrastructure, lack of digital competencies among teachers and students, and resistance to change within educational institutions. Addressing these issues requires systematic efforts, including teacher training, modernization of equipment, and development of methodological support.

In addition, the concept of student-centered learning has become increasingly important. This approach shifts the focus from the teacher to the learner, encouraging active participation, independent thinking, and collaboration. Students are no longer passive recipients of information but active participants in the educational process.

The aim of this study is to analyze modern teaching methodologies used in technical colleges, evaluate their effectiveness, and identify key directions for improving the educational process. The study focuses on practice-oriented approaches, digital technologies, and innovative teaching methods that contribute to the development of professional competencies.

Main Part

1. Transformation of Teaching Approaches in Technical Education

The transformation of teaching methodologies in technical colleges is driven by the need to align education with modern industry requirements. Traditional lecture-based instruction, while still important for delivering fundamental knowledge, is no longer sufficient on its own.

Modern approaches emphasize active learning, where students participate directly in the educational process. This includes discussions, case studies, and problem-solving tasks. Such methods help develop analytical thinking and improve knowledge retention.

The shift from teacher-centered to student-centered learning represents a key paradigm change in modern education.

2. Practice-Oriented Learning as a Core Principle

Practice-oriented learning is a fundamental component of technical education. It ensures that students are able to apply theoretical knowledge in real-world contexts.

This approach includes:

laboratory experiments;

practical training sessions;

industrial internships;

project-based assignments.

Through these activities, students gain hands-on experience and develop professional competencies required in their future careers.

In addition, collaboration with industry partners allows educational institutions to adapt curricula to current labor market demands.

3. Integration of Digital Technologies in the Learning Process

Digital technologies significantly enhance the teaching and learning process. They provide new tools for content delivery, communication, and assessment.

Key digital tools include:

learning management systems (LMS);

virtual laboratories and simulations;

multimedia presentations;

online assessment systems.

These technologies support blended learning models, combining traditional classroom instruction with online components.

Moreover, digitalization allows for personalized learning, where students can progress at their own pace and receive immediate feedback.

4. Evaluation of Teaching Effectiveness

The effectiveness of teaching methodologies can be expressed as:

$$E = S / T$$

where:

E – effectiveness of teaching;

S – student learning outcomes;

T – time spent on learning.

This simplified model demonstrates that effective teaching methods lead to higher learning outcomes within a shorter time.

In practice, effectiveness can be assessed through student performance, engagement, and the level of competency development.

5. Project-Based and Problem-Based Learning

Project-based learning (PBL) and problem-based learning are widely used in modern technical education. These approaches involve students in solving real or simulated problems.

Advantages include:

development of critical thinking;

improvement of teamwork skills;

increased motivation;

better understanding of subject matter.

Students become active participants in the learning process, which leads to deeper knowledge acquisition.

6. Challenges in Implementing Modern Methodologies

Despite the advantages of modern teaching approaches, several challenges remain:

limited access to modern equipment;

insufficient digital literacy among teachers and students;

lack of methodological support;

resistance to adopting new technologies.

Addressing these challenges requires institutional support, professional development programs, and investment in educational infrastructure.

7. Strategies for Improving Teaching Quality

To enhance the effectiveness of teaching methodologies in technical colleges, the following strategies are recommended:

integration of digital tools into all disciplines;

expansion of practical training components;

continuous professional development of teachers;

strengthening collaboration with industry partners;

implementation of innovative assessment methods.

These measures contribute to improving the overall quality of education and preparing students for modern professional environments.

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DIGITALISATION AND ARTIFICIAL INTELLIGENCE AS DRIVERS OF TRANSFORMATION IN THE MODERN ECONOMY AND BUSINESS

Aruna Zhumanazar

M.Auezov South Kazakhstan University, Shymkent, Kazakhstan
zumanazararuna@gmail.com

Abstract: This article examines the impact of digitalisation and artificial intelligence technologies on structural changes in the modern economy and the transformation of business processes. It explores key areas for the implementation of intelligent systems in the managerial and operational activities of organisations, as well as their contribution to improving efficiency, reducing costs and enhancing competitiveness. The article argues that, despite the high potential of artificial intelligence as an optimisation tool, its functional capabilities are limited in the context of strategic thinking and complex decision-making. It emphasises that sustainable business development in the digital economy is achieved through the synergy of human capital and intelligent technologies.

Keywords: *digitalisation, artificial intelligence, business processes, economic transformation.*

Against the backdrop of global digital transformation, the economy and business are undergoing fundamental changes driven by the adoption of modern information and communication technologies. One of the key drivers of these processes is artificial intelligence (AI), which is becoming an integral part of how organisations and markets operate. The relevance of this topic stems from the fact that, in the coming years, AI will play a decisive role in economic development, shaping new models of management, production and customer interaction. Even today, it is impossible to imagine large companies without the use of digital tools, automation and analytical systems. The aim of this article is to analyse the role of digitalisation and artificial intelligence in the transformation of the modern economy, as well as to define the limits of their application in business.

Digitalisation is a systematic process of integrating digital technologies into economic activity, accompanied by changes in market structures, consumption patterns and management mechanisms. Unlike simple automation, digitalisation affects not only the operational level but also the strategic aspects of how the economy functions. A key element of digitalisation is the shift towards data as a primary resource.

Economic value is generated through the collection, processing and analysis of large volumes of information, enabling companies to make informed management decisions in real time. This results in a reduction in information asymmetry and increased transparency in the business environment. A significant trend is the platformisation of the economy. Digital platforms are transforming traditional markets, reducing the role of intermediaries and enabling direct interaction between producers and consumers. This leads to a reduction in transaction costs and an acceleration of capital turnover. Digitalisation facilitates the development of flexible business models based on rapid scaling and adaptation to changes in the external environment. The use of cloud technologies and digital infrastructures enables companies to minimise capital expenditure and focus on their core competencies. Consequently, digitalisation serves as the foundation of the modern economy, facilitating the transition from an industrial model to a digital one, where information and the speed at which it is processed become the primary drivers of growth.

Artificial intelligence is a key tool for advanced digitalisation, facilitating the transition from operational automation to intelligent process management. Its main advantage lies in its ability to analyse large volumes of data and identify patterns that are inaccessible to traditional methods of analysis. In business processes, AI is primarily used to optimise operational activities. In demand management, machine learning algorithms enable highly accurate forecasting of consumer behaviour, thereby reducing costs associated with excess inventory and logistics. In the financial sector, AI is used for risk assessment, the detection of fraudulent transactions and the automation of analytical procedures. [1]. In the field of human resources management, intelligent systems enable the analysis of employee performance, the forecasting of staff turnover, and the improvement of recruitment efficiency. In marketing, AI enables the personalisation of customer interactions by generating tailored offers based on the analysis of user behaviour. The use of AI in customer service deserves special attention. Virtual assistants and chatbots provide round-the-clock support, reducing the workload on staff and speeding up the processing of enquiries. This helps to increase customer satisfaction and reduce operational costs. Despite significant advantages, the application of artificial intelligence is of a supporting nature. Its effectiveness depends directly on the quality of the input data and the accuracy of the algorithms. Furthermore, AI is not capable of independently formulating strategic objectives or taking into account complex socio-economic factors. Based on the above, artificial intelligence is an important factor in improving the efficiency of business processes; however, its role lies in enhancing human analytical and operational capabilities, rather than replacing them [2].

Artificial intelligence significantly improves the efficiency of information processing through the use of algorithms capable of handling large volumes of data and identifying hidden patterns. The application of AI reduces operational costs, minimises the human factor in routine tasks and enhances the accuracy of analytical conclusions. In a highly competitive environment, this creates sustainable advantages for companies that integrate intelligent systems into their management and operational activities. A key advantage is AI's ability to operate in a continuous data-processing mode without compromising the quality of results. This is particularly important in financial analytics, logistics and customer experience management, where response speed directly impacts business performance metrics. Machine learning algorithms are capable of adapting to changes in input data, ensuring more accurate forecasting and rapid adjustment of decisions [3]. At the same time, a number of fundamental limitations remain. AI operates within the framework of predefined algorithms and lacks an independent understanding of context beyond the training dataset. The quality of the results is directly determined by the completeness and reliability of the source data. Errors in the data or incorrect models lead to distorted analytical conclusions. A separate issue remains the lack of creative and critical thinking. Artificial intelligence is incapable of forming new concepts outside the given logic, nor can it take into account the moral and ethical aspects of management decisions. In strategic management, this limitation is of key importance, as long-term development requires a comprehensive analysis that includes social, cultural and behavioural factors. Consequently, it is advisable to view AI as a tool for improving efficiency, rather than as an autonomous decision-making system. Its application requires human oversight and integration with expert judgement [4].

The development of artificial intelligence is characterised by steady growth and an expanding range of applications. Intelligent technologies are gradually becoming a fundamental component of the economic infrastructure, influencing the emergence of new markets and the transformation of existing industries. One of the key areas is the further automation of management processes. Companies are moving towards using systems capable not only of analysing data, but also of proposing optimal management decisions based on predictive models. This increases the speed at which businesses can respond to changes in the external environment and reduces the level of uncertainty. AI is having a significant impact on the labour market. A redistribution of roles is taking place: routine tasks are being handed over to automated systems, whilst demand is growing for specialists with analytical thinking, digital skills and data handling abilities. New professional fields are emerging, linked to the development, implementation and monitoring of intelligent technologies. The economic system is

gradually becoming highly adaptable [5]. The use of AI facilitates the personalisation of products and services, thereby enhancing the fulfilment of consumer needs. Companies are able to develop more precise strategies for engaging with customers, which strengthens their competitive position. Despite the rapid advancement of technology, the key role of the human element remains. The effectiveness of AI implementation is determined by the quality of management decisions made on the basis of its analytical results. The future of the economy lies in the integration of human capital and intelligent systems, where technology acts as a tool to enhance capabilities rather than replace them. In the long term, artificial intelligence will become an integral part of the economic environment. Its influence will be evident not only in increased productivity but also in changes to the principles of business organisation and resource management.

Digitalisation and artificial intelligence are key drivers of economic and business transformation. Their implementation facilitates the transition to data-driven management, reduces costs, speeds up operations and improves the accuracy of decision-making. Companies integrating AI into their business processes demonstrate increased productivity, improved customer service and a stronger competitive position. At the same time, limitations have been identified: the dependence of results on data quality, a lack of creative and strategic thinking, and an inability to take into account the complex socio-economic context [6]. This confirms that AI cannot replace humans in managerial decision-making. The most effective development model is the integration of AI and human capital. In such circumstances, technology performs analytical and operational functions, whilst humans provide strategic management. The expansion of AI applications in the near future will become a sustained trend and a defining factor in the development of the digital economy.

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