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DEVELOPMENT OF THE EDUCATION SYSTEM THROUGH ARTIFICIAL INTELLIGENCE AND DIGITAL TECHNOLOGIES AND ITS CHALLENGES

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Abstract: This article analyzes the role and development processes of digital technologies and artificial intelligence (AI) in modern society across economic, social, and cultural spheres. It examines the historical stages of digital technologies and AI, their significance in society, and their impact on transformations in business, healthcare, education, and culture. The opportunities and limitations of the digital revolution and AI are discussed, along with the necessity of their effective and safe implementation on a global scale. The article encourages reflection on the future of modern technologies, their impact on human life, and their role in societal development. It presents a comprehensive analysis from scientific, technical, and social perspectives and draws important conclusions about the future of digital technologies and artificial intelligence.

Keywords: digital technologies, artificial intelligence, economy, healthcare, education, business, social change, big data, cloud computing, deep learning, telemedicine, digital transformation, innovation, internet, online services, automation, communication technologies.

Introduction

Today, digital technologies and artificial intelligence (AI) have become key drivers of society, the economy, and everyday life worldwide. These technologies not only foster technical innovations but also contribute to the emergence of new economic systems and cultural transformations. Alongside rapid development, they bring significant opportunities, challenges, and risks.

Challenges of Implementing AI in Education

The integration of AI technologies into education faces several challenges:

Software complexity and cybersecurity threats

Protection of students' personal data (Selwyn, 2019)

High financial costs and infrastructure requirements (West, 2021)

Need to improve teachers' digital competencies (Luckin et al., 2018)

Despite these issues, AI has great potential to:

automate educational processes

personalize learning

improve efficiency

AI tools enable adaptive learning systems tailored to individual student needs and automated assessment systems that increase transparency and reduce human error.

Digital Technologies and Their Historical Development

Digital technologies are based on storing, processing, and transmitting information in digital form (0 and 1). Their development includes:

Emergence of computers

Spread of the internet

Development of cloud computing

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Growth of big data technologies

Since the 1980s–1990s, computers and the internet have entered daily life. From the 2000s, mobile technologies and global connectivity expanded significantly. Today, technologies such as cloud computing, IoT, and blockchain make society more efficient and interactive.

Foundations and Development of Artificial Intelligence

Artificial Intelligence (AI) refers to systems that simulate human thinking, learning, and decision-making processes.

AI development began in the 1950s with scientists like Alan Turing. His **Turing Test** became a key concept in AI research.

Modern AI includes:

Machine Learning

Deep Learning

Natural Language Processing

Image Recognition

These technologies enable organizations to analyze data efficiently, make predictions, and solve complex problems.

Trends in Digital Technologies

Key achievements include:

1. **Faster data transmission and storage**

Global internet expansion

Cloud systems for large-scale data management

2. **Mobile technologies**

Smartphones and applications transforming daily life

3. **Automation and digital production**

Robotics, 3D printing, and smart systems improving efficiency

Capabilities of Artificial Intelligence

AI can be categorized into:

1. **Advanced (Strong) AI**

Simulates human intelligence

Used in medicine, law, and finance

2. **Narrow (Applied) AI**

Designed for specific tasks

Example: self-driving cars, industrial robots

Impact of AI and Digital Technologies on Society

1. Economy and Business

Optimization of production

Cost reduction

Personalized services

Growth of e-commerce

2. Healthcare

Early disease detection

Personalized treatment

Telemedicine services

3. Education

Distance learning

Automated assessment

Personalized learning systems

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4. Society and Culture
New communication forms
Increased information exchange
Possible social inequality issues
5. Transport and Logistics
Autonomous vehicles
Faster and safer delivery systems
6. Industry
Increased safety
Improved product quality
Higher productivity

AI in Global Politics
AI and digital technologies play an increasing role in global politics by:
strengthening economic competitiveness
influencing global security
increasing technological rivalry among nations
Risks and Ethical Issues
Privacy and data security – risk of data breaches
Automation and employment – job displacement
Ethics in decision-making – AI decisions may not align with human values
Conclusion

Artificial intelligence and digital technologies are transforming all aspects of human life. While they offer significant benefits in education, healthcare, and industry, they also raise serious challenges.

The effective implementation of AI in education requires:
technological readiness
methodological innovation
economic support

If these challenges are addressed systematically, AI can significantly improve the quality and efficiency of education and shape the future learning model.

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