

TRANSFORMING VOCATIONAL EDUCATION THROUGH ARTIFICIAL INTELLIGENCE: COMPETENCY DEVELOPMENT FOR THE DIGITAL ECONOMY

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Abstract

Artificial Intelligence (AI) technologies play a crucial role in shaping student competencies in vocational education and preparing them for the digital economy. This article analyzes the advantages, pedagogical approaches, and practical outcomes of implementing AI-based adaptive learning systems in Uzbek technical schools and colleges. The results indicate that AI integration enables students to follow individualized learning paths, enhances their skills, and prepares them for labor market competencies required in the digital economy.

Keywords: artificial intelligence, vocational education, competency-based learning, digital economy, adaptive learning system.

Introduction

With the rapid development of the digital economy, vocational education is undergoing a significant transformation. Traditional methods in Uzbek technical schools and colleges often fail to sufficiently align student skills with labor market requirements. Consequently, Artificial Intelligence (AI) technologies have emerged as an effective tool in vocational education.

AI-based approaches enable the following in the learning process:

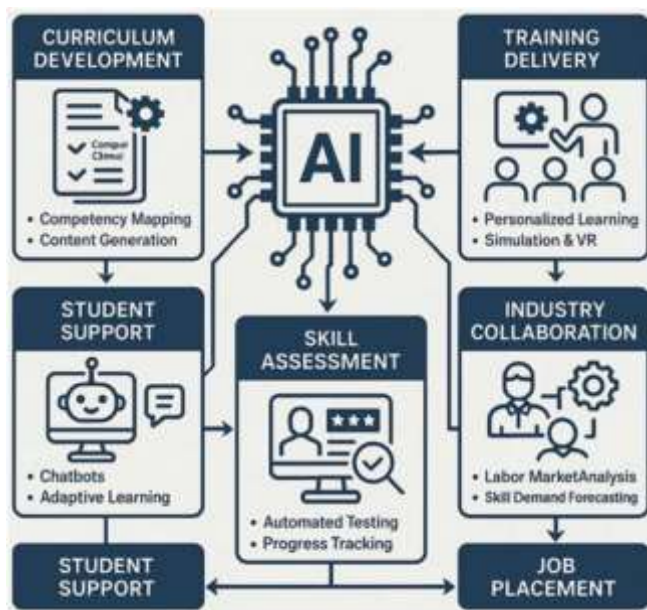
- Students' knowledge levels are personalized through adaptive learning systems.
- Realistic work conditions can be simulated for practice.
- Skills and competencies are developed in accordance with digital economy demands.

Objective: To analyze the potential of AI technologies in Uzbek vocational education for developing competency-based skills.

Methods

The study employed the following methods:

1. **Analytical review:** Current curricula and AI integration opportunities in Uzbek technical schools and colleges were examined.
2. **Experimental trial:** An AI-based adaptive learning platform was tested with a group of 50 students.
3. **Surveys and interviews:** Teachers and students shared their experiences using AI systems.
4. **Comparative analysis:** The effectiveness of traditional teaching versus AI-assisted teaching was compared.



Key elements of ai in vocational education: curriculum, competency assessment, industry collaboration, and student support.

Key technologies used:

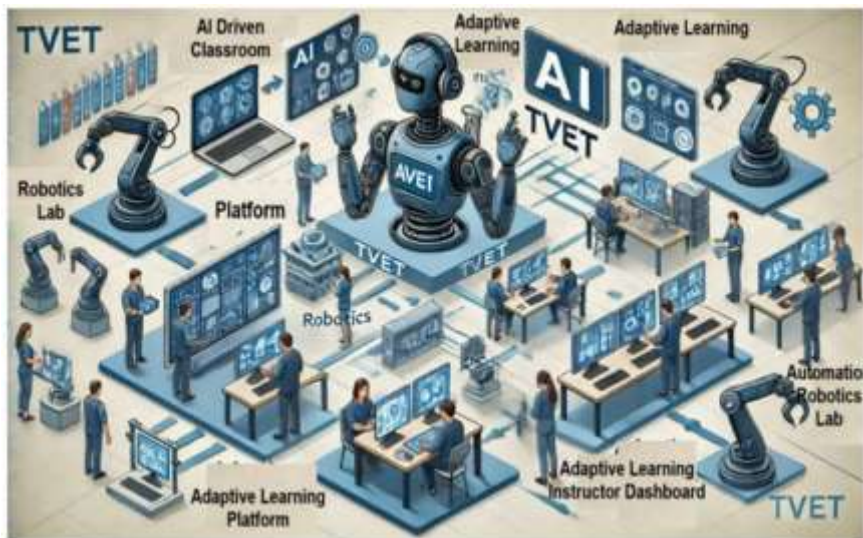
- AI platforms (adaptive learning systems)
- Virtual laboratories and simulation software
- Digital skill assessment tools

Results

The study results showed:

1. **Student competencies:** The group taught using AI-based methods showed a 23% improvement in skill levels.
2. **Individual learning paths:** Students received tasks matched to their knowledge levels, increasing motivation.
3. **Teacher feedback:** Teachers found it easier to manage learning and monitor student progress using AI systems.
4. **Alignment with the digital economy:** Students acquired labor market-relevant digital competencies faster (IT, cybersecurity, data analysis fundamentals).

Diagram suggestion: Bar charts or line graphs can be used to visualize changes in skill levels and motivation.



Integration of ai in vocational education: an ecosystem overview with ai-driven training, virtual laboratories, and personalized learning paths

Discussion

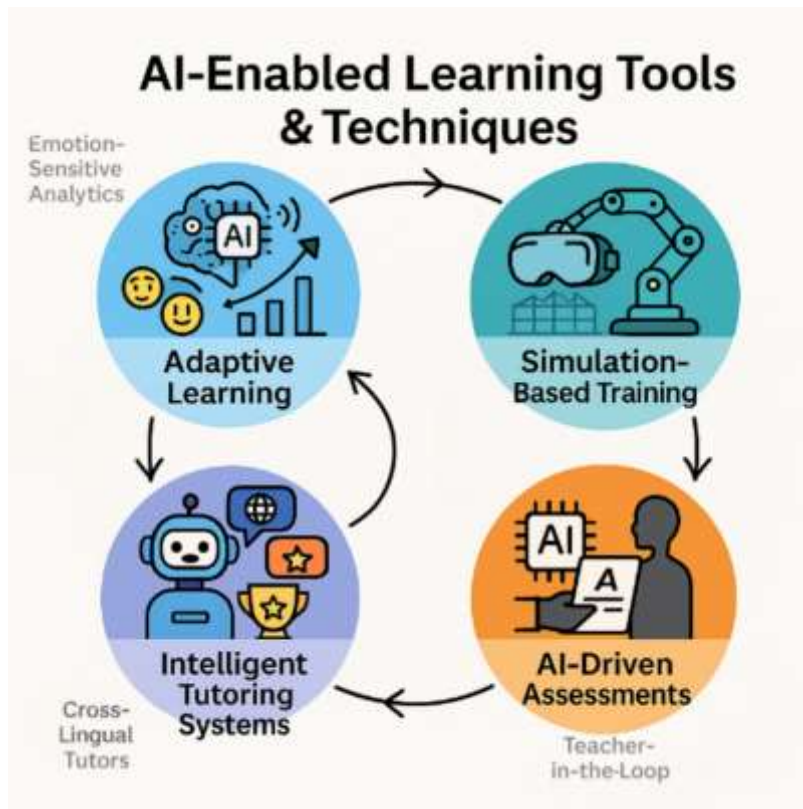
AI technologies provide several pedagogical and practical benefits in vocational education:

- **Adaptivity:** Each student can follow a personalized learning path.
- **Skill development:** Both technical and soft skills relevant to the digital economy are enhanced.

- **Teacher’s role:** Teachers act as mentors and can monitor progress in real-time.

- **Global relevance:** The Uzbek experience can serve as a case study for AI integration in vocational education internationally.

Limitations: Limited technological infrastructure, insufficient AI expertise among teachers, and a lack of resources for students.



AI educational technologies and adaptive learning ecosystem diagram.

Conclusion

Integrating AI into vocational education in Uzbekistan enhances student competencies, prepares them for the digital economy, and develops a competitive workforce. AI integration optimizes pedagogical processes and ensures individualized learning approaches. Future efforts should focus on expanding AI-supported curricula and improving teacher training in AI applications.

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