

FOREIGN EXPERIENCE IN USING ARTIFICIAL INTELLIGENCE IN SPECIALIZED EDUCATIONAL INSTITUTIONS

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ABSTRACT

This thesis examines international experience in applying artificial intelligence (AI) in specialized educational institutions, including technical schools, medical colleges, military academies, and vocational training centers. It analyzes how AI-driven technologies optimize teaching, assessment, individualized learning, administrative processes, and professional skill development. The study also explores challenges related to ethics, data security, teacher readiness, and cultural adaptation. A comparative overview of practices in the United States, European Union, South Korea, Singapore, and China provides insights for improving AI integration in similar institutions in developing regions.

Introduction

Artificial intelligence has rapidly evolved from a technological novelty into a transformative force shaping the future of education worldwide. In specialized educational institutions—where training is directly linked to professional competence and high-risk decision-making—the demand for precision, efficiency, and individualized learning is even stronger. Therefore, countries with advanced digital ecosystems have actively integrated AI tools into their educational frameworks to modernize training systems and better prepare students for real-life professional environments [1].

One of the leading trends in foreign educational systems is the adoption of adaptive learning platforms. Institutions in the United States and the European Union use AI-based systems such as Knewton, Century Tech, and Carnegie Learning to analyze student performance in real time and offer personalized learning paths. These platforms detect gaps in knowledge, adjust the difficulty of tasks, and recommend additional materials tailored to each learner's cognitive profile. In specialized schools—for instance medical colleges—such systems help students practice clinical reasoning through simulated patient scenarios that adapt to the student's decision-making style [2].

Materials and methods

Another notable practice is the integration of AI-powered simulators and virtual reality environments. South Korea and Singapore have pioneered medical, aviation, engineering, and cybersecurity training using hybrid systems that combine AI with VR/AR technologies. For example, AI-driven surgical simulators analyze hand movements, pressure, and reaction time,

providing instant feedback for skill correction. In military academies, AI algorithms generate dynamic battlefield simulations, enabling cadets to practice strategic decision-making without physical risk. This reduces training costs while ensuring high-quality practical preparation [3].

Holmes [1] emphasizes the transformative potential of AI in education, arguing that its greatest strength lies in personalization and intelligent data analysis. He illustrates how adaptive algorithms replace one-size-fits-all teaching, a principle that specialized institutions especially benefit from.

Baker [2] provides a comprehensive overview of adaptive learning systems, focusing on their ability to identify micro-skills and knowledge gaps among students. His research confirms that such tools significantly enhance learning efficiency in complex subjects like engineering and medicine.

Lim and Wang [3] analyze AI-driven simulators used in Singapore and South Korea. They highlight that simulation-based learning reduces training risks and improves procedural competencies—an essential requirement in health sciences and aviation programs.

Zhang [4] examines China's extensive use of AI for student monitoring and performance assessment. While recognizing efficiency gains, he also acknowledges ethical dilemmas related to privacy and data transparency.

The European Commission report [5] explains how AI optimizes educational administration, enabling institutions to anticipate student needs, reduce dropout rates, and improve academic planning.

Results And Discussion

In China, specialized secondary and vocational institutions widely apply AI-based assessment and monitoring systems. These systems evaluate not only academic performance but also behavioral factors such as attentiveness, participation, and completion of project tasks. Machine learning models generate comprehensive learner profiles that help teachers design targeted interventions. Although such methods raise ethical debates, Chinese institutions report significant improvements in performance and reduced workload for instructors, who spend less time on administrative tasks and more on mentoring [4].

Foreign studies highlight the importance of AI-supported administrative automation in specialized education. Universities and vocational colleges in Europe use AI tools to manage enrollment, predict student dropout risks, optimize course scheduling, and evaluate teacher performance. This level of automation ensures that human resources are used more efficiently, particularly in institutions where highly technical or health-related subjects demand intensive faculty engagement [5].

AI also enhances inclusive learning in specialized schools. In Canada and Finland, machine-learning tools assist students with dyslexia, ADHD, or sensory impairments by providing real-time transcription, voice-to-text conversion, emotional-tone analysis, and personalized instructional strategies. This creates equitable learning conditions even in programs that require advanced scientific or technical competencies.

However, international experience also reveals several challenges. Ethical debates regarding data privacy, algorithmic bias, and over-surveillance remain unresolved. Some European institutions restrict the use of facial-recognition technologies due to privacy concerns, while U.S. colleges emphasize transparency in AI decision-making systems. Another

challenge is the need for teacher readiness: educators must understand how AI tools function to integrate them meaningfully, yet many professionals lack the necessary digital competence. Additionally, the cultural relevance of AI-generated content requires careful consideration; models trained on Western data sets may produce irrelevant or inappropriate content in non-Western contexts.

Despite these challenges, foreign practices demonstrate that AI contributes to higher quality education, optimized learning trajectories, and stronger professional preparation. Specialized institutions that strategically implement AI—rather than adopting it superficially—experience significant improvements in learning outcomes, practical skill acquisition, and institutional efficiency. For countries seeking to modernize their vocational and professional education, studying and adapting these international experiences provides a valuable pathway toward innovation and global competitiveness.

In many countries, the integration of artificial intelligence into specialized educational institutions has evolved from an experimental trend into a strategic priority. What distinguishes foreign experience in this area is the systemic, policy-driven and evidence-based approach that ensures AI tools are not simply inserted into the classroom, but meaningfully embedded into the pedagogical and administrative infrastructure of schools, colleges, and vocational training centers. In leading education systems, AI is viewed as both a technological and didactic resource that supports personalization, accelerates skills development, and expands opportunities for learners with diverse needs.

Conclusion

Foreign experience shows that artificial intelligence plays a transformative role in specialized educational institutions by enhancing personalization, practical training, evaluation, inclusion, and institutional management. Advanced countries have demonstrated that AI, when implemented ethically and strategically, can significantly improve the quality of professional preparation and reduce the burden on educators. However, successful adoption requires strong digital infrastructure, teacher training, and clear ethical regulations. Integrating these best practices into developing educational systems may help achieve a modern, competitive, and student-centered learning environment..

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