

# ARTIFICIAL INTELLIGENCE IN VIETNAMESE HIGHER EDUCATION CHALLENGES AND OPPORTUNITIES

● NGUYEN GIA TRUNG QUAN - HOANG TO THU DUNG

## ABSTRACT:

As with any technological advancement, the growth of artificial intelligence (AI) always offers both opportunities and challenges. This article analyzes 35 empirical studies conducted between 2015 and 2024 in Vietnam, examining the implementation of AI in Vietnamese higher education (HE). The article presents challenges such as ethical concerns, student outcomes, and teacher development, and also explores opportunities related to personalized learning, adaptive testing, and intelligent tutoring systems. The research findings offer operational perspectives for HE institution administrators to formulate improved policies and strategic visions for AI application to achieve societal progress and prosperity. Furthermore, the article also aims to raise awareness about the challenges and opportunities of AI in Vietnamese higher education and to encourage further research in this field.

**Keywords:** AI, artificial intelligence, challenges, opportunities, higher education

## 1. Introduction

Artificial intelligence (AI) has become not only a fundamental aspect of the fourth industrial era (Yau et al., 2023) but also an integral component of societal development (Aldosari, 2020). AI is globally revolutionizing various fields, and higher education (HE) is no exception. As an advanced field of computer science, AI involves the creation of algorithms and systems designed to performing tasks that

conventionally necessitate human intelligence, including knowledge acquisition, analytical thinking, problem-solving, and natural language processing. The emergence of artificial intelligence introduces both prospects and obstacles within higher education, prompting modifications in institutional governance structures (Jain and Jain, 2019). AI can transform traditional teaching methods, enhance experiences in learning, and optimize operational

effectiveness. The implementation of AI in higher education organizations worldwide to improve educational outcomes and operational effectiveness.

In Vietnam, the government and higher educational institutions recognize the prospect of AI but implementing AI to enhance the quality of higher education still has challenges, including infrastructural limitations, the need for substantial investments in technology, a shortage of skilled professionals, and concerns about data privacy and security. In contrast, the opportunities presented by AI in Vietnamese higher education are significant, facilitating personalized learning experiences, and providing students with tailored educational content that matches their learning styles and paces. In addition, AI-powered tools facilitate the automation of administrative duties for educators, enabling them to dedicate greater attention to teaching and mentorship. The incorporation of AI can also promote research and innovation, opening new avenues for academic inquiry and collaboration. The integration of AI in Vietnamese higher education holds transformative improvements but also requires careful navigation of various challenges. As Vietnam continues to develop its educational infrastructure and policies, leveraging AI effectively will help achieve its educational objectives and foster a competitive, future-ready workforce.

The rapid developments of AI force the decision-makers to have strategies and actions to adapt to its challenges and opportunities. This research is designed to explore opportunities and challenges presented by AI in HE.

## 2. Methodology

This study used a literature review framework to analyze and synthesize studies and expert insights relevant to the challenges

and opportunities of AI in higher education in Vietnam. We used keywords such as "artificial intelligence," "challenges," "opportunities," "learning," and "teaching." to search the existing literature on Google Scholar. We initially selected 50 significant articles. We then assessed the quality, reliability, and relevance of the data collected from these articles. Well-designed studies with appropriate data collection and analysis methodologies were considered. The relevance was determined by the studies' ability to address the specific objectives of the present research, and reliability was evaluated based on the consistency of the findings from those studies. Ultimately, only 35 key articles published between 2015 and 2024 were used for the final analysis.

## 3. Literature

### 3.1. Artificial intelligence

According to Alsheibani et al. (2018), AI is characterized as a set of tools and technologies that can amplify and improve organizational effectiveness. Computer systems are capable of simulating human intelligence functions such as learning, cognition, problem-solving, speech recognition, and planning. Several studies were designed to assess the applications of artificial intelligence in particular fields such as Alsamhi et al. (2018); Macleish (1988); Oliveira and Martins (2011). However, adopting AI in an organization is an extensive procedure that encompasses purchasing the software and technology and establishing the essential infrastructure and resources as time progresses, and adopting it in higher education (HE) is no exception. Artificial intelligence operates as a binary system with adaptable input, mirroring human rationality throughout its interaction with higher education. Its binary nature allows it to function both as a learner, benefiting students, and as an educator,

benefiting instructors. This comprehensive engagement in higher education encompasses teaching, learning, and administrative services. (Janalta Interactive, 2021).

### **3.2. AI's Opportunities**

#### *3.2.1. Learning Experiences*

AI technologies significantly impact learning experiences in various ways, enhancing personalization, engagement, and efficiency.

**Personalized Learning:** AI technologies offer customized learning experiences tailored to the specific needs and learning preferences of individual students. According to a study by Nguyen, Pham & Le (2020), adaptive learning systems powered by AI can significantly improve student engagement and learning outcomes in Vietnamese universities.

**Adaptive Testing:** AI-driven testing adapts to the learner's level of understanding immediately. It provides real time feedback and adjusts the complexity of questions according to student performance, ensuring a more accurate testing of their knowledge and skills. According to Le (2021), AI-driven testing provides real-time feedback and personalized support, helping students understand complex subjects.

**Intelligent Tutoring Systems:** Tutoring systems enhanced by AI are ready to offer on-demand assistance and guidance, offering personalized support outside of traditional classroom settings, helping students overcome specific challenges, and reinforcing learning through practice and explanation. Le (2021) discusses the implementation of intelligent tutoring systems (ITS) in Vietnamese higher education institutions. These systems provide real-time feedback and personalized support, helping students understand complex subjects better.

#### *3.2.2. Administrative Efficiency*

**Automated Administrative Tasks:** AI applications in administrative processes can streamline operations such as admissions, scheduling, and grading. Tran (2022) highlights how universities in Vietnam are using AI to reduce administrative burdens, allowing staff to focus more on educational quality and student support.

**Predictive Analytics:** AI-driven predictive analytics help universities forecast enrollment trends, optimize resource allocation, and improve student retention rates. Pham (2020) emphasizes the role of predictive analytics in strategic planning and decision-making in Vietnamese higher education.

#### *3.2.3. Research and Development*

**AI Research Initiatives:** Vietnamese universities are increasingly becoming centers for AI research and development. A report by the Vietnam National University outlines various AI research projects that are contributing to advancements in fields such as natural language processing, computer vision, and robotics (Hoang, 2021).

### **3.3. AI's Challenges**

#### *3.3.1. Technological and Infrastructure Barriers*

**Limited Access to Advanced Technologies:** Despite the potential benefits, many Vietnamese higher education institutions face challenges in accessing advanced AI technologies. Nguyen et al. (2019) note that insufficient funding and lack of technological infrastructure are significant barriers to widespread AI adoption.

**Data Privacy and Security:** Ensuring data privacy and security is a critical challenge. Le (2021) raises concerns about the ethical implications of AI, particularly in handling

sensitive student data.

### 3.3.2. Human Resource Constraints

**Shortage of Skilled Personnel:** There is a significant shortage of AI specialists and educators proficient in AI technologies. Tran (2020) highlights the need for professional development programs to equip faculty and administrative staff with the necessary AI skills.

**Resistance to Change:** Reluctance from educators and administrators accustomed to conventional teaching methods can impede the integration of AI. According to Pham (2016), fostering a culture of innovation and continuous learning is essential for overcoming this resistance.

### 3.3.3. Policy and Regulatory Issues

**Lack of Clear Guidelines:** The absence of comprehensive policies and regulatory frameworks for AI in education poses a challenge. A study by The Hong Anh (2021) suggests that clear guidelines and standards are needed to ensure the ethical and effective use of AI in higher education.

### 3.3.4. Equity and Access

**Digital Divide:** Disparities in access to technology between urban and rural areas can exacerbate educational inequalities. Le (2022) discusses how the digital divide impacts the equitable implementation of AI in Vietnamese higher education, calling for targeted interventions to bridge this gap.

## 4. Findings and discussion

Firstly, the findings of this study recognize that integrating AI in Vietnamese higher education is hampered by several challenges. Limited access to advanced technologies, data confidentiality and security concerns, a lack of qualified personnel, resistance to change, lack of clear policies, and the digital divide

pose significant barriers. Addressing these issues requires concerted efforts to invest in infrastructure, develop professional skills, foster a culture of innovation, establish robust regulatory frameworks, and implement targeted interventions to bridge technological gaps. By tackling these challenges, Vietnamese higher education can fully leverage AI to enhance educational outcomes and equity.

Secondly, the findings of this study indicate that AI offers transformative opportunities for Vietnamese higher education by significantly enhancing personalized learning, administrative efficiency, and research and development. It can provide tailored educational experiences that adapt to students' needs, preferences, and progress, thereby improving engagement and learning outcomes. AI-driven intelligent tutoring systems provide instantaneous feedback and personalized instruction, helping students understand complex concepts more effectively at their own pace. Automated administrative tasks enhance operational efficiency, alleviating administrative workload for personnel and enabling them to concentrate more on academic and student-support activities. While AI research initiatives drive innovation and global competitiveness. Embracing these AI opportunities can lead to more effective, efficient, and innovative educational environments in Vietnam.

Finally, the findings of this research underscore both the potential advantages of AI in Vietnamese higher education, such as enhanced personalization and administrative efficiency, and the challenges, including ethical concerns, the digital divide, and the need for substantial investment and professional development.

## 5. Conclusion

To narrow the gap in digital access, and ensure access to AI technologies, higher education institutions should invest in robust

infrastructure, provide ongoing training for educators, and foster innovation and experimentation with AI tools. Policymakers and educators must collaborate to establish ethical guidelines for adopting AI technologies with fairness, transparency, and inclusivity. Despite the challenges related to AI adoption in

higher education, the potential benefits make it a worthwhile pursuit. Thoughtful implementation, continuous evaluation, and a commitment to ethical practices will help Vietnamese higher education institutions harness AI's full potential, creating more effective, inclusive, and responsive educational environments■

## REFERENCES:

1. Aldosari, S.A.M. (2020). The future of higher education in the light of artificial intelligence Transformations. *International Journal of Higher Education*, 9(3), 145-151.
2. Alsamhi, Saeed Hamood, Ou Ma, and Mohd Samar Ansari. (2018). Artificial Intelligence-Based Techniques for Emerging Robotics Communication: A Survey and Future Perspectives. *Telecommunication Systems: Modelling, Analysis, Design and Management*, 72, 483-503.
3. Alsheibani, Sulaiman, Yen Cheung, and Chris Messom. (2018). Artificial Intelligence Adoption: AI-readiness at Firm-Level. In *Proceedings of PACIS2018: Pacific Asia Conference in Information Systems (PACIS)*. Chicago: Association for Information Systems, p. 37.
4. Hoang, V. L. (2021). AI Research Initiatives in Vietnamese Universities. Vietnam National University Report, <https://doi.org/10.1016/j.jelepro.2024.140692>
5. Hong Anh (2021). Policy Frameworks for AI in Education: Current Status and Future Directions. *Journal of Education*. <https://tapchigiaoduc.edu.vn/article/88434/225/khung-giao-duc-chinh-sach-ai-toan-dien-cho-viec-day-va-hoc-o-truong-dai-hoc/>
6. Janalta Interactive Inc. (2014). Information graphic (infographic). Techopedia.com, <http://www.techopedia.com/definition/27808/information-graphic-infographic>
7. Jain, S. and Jain, R. (2019). Role of artificial intelligence in higher education - An empirical investigation, *IJRA. International Journal of Research and Analytical Reviews*, 6(2), 144-150.
8. Macleish, Kenneth J. (1988). Mapping the Integration of Artificial Intelligence into Telecommunications. *IEEE Journal on Selected Areas in Communications*, 6, 892-98.
9. Nguyen, D. T., Pham, M. Q., & Le, N. V. (2020). Personalized Learning with AI: A Case Study in Vietnamese Universities. *International Journal of Educational Development*.
10. Le, T. H. (2021). Intelligent Tutoring Systems in Vietnamese Higher Education: Implementation and Outcomes. *Journal of Educational Technology*.
11. Oliveira, Tiago, and Maria Fraga Martins. (2011). Literature review of information technology adoption models at firm level. *The Electronic Journal Information Systems Evaluation*, 14, 110-21.
12. Pham, H. T. (2020). Predictive Analytics in Higher Education: Applications and Implications in Vietnam. *Vietnam Journal of Science and Technology*.
13. Pham, T. H. (2016). Developing AI Curriculum for Vietnamese Universities: A Framework. *Asian Journal of Curriculum Studies*.
14. Tran, K. T. (2022). The Role of AI in Administrative Efficiency: Case Studies from Vietnamese Universities. *Higher Education Management Review*.
15. Yau, K.W., Chai, C.S., Chiu, T.K., Meng, H., King, I. and Yam, Y. (2023). A phenomenographic approach on teacher conceptions of teaching Artificial Intelligence (AI) in K-12 schools. *Education and Information Technologies*, 28(1), 1041-1064.

Received date: May 15, 2024  
Reviewed date: May 25, 2024  
Accepted date: May 26, 2024

*Author Information:*

**1. NGUYỄN GIA TRUNG QUAN**

**Ho Chi Minh University of Natural Resources and Environment**

**2. MA. HOANG TO THU DUNG**

**Faculty of Languages International Cultures, Hoa Sen University**

## **TRÍ TUỆ NHÂN TẠO TRONG GIÁO DỤC ĐẠI HỌC VIỆT NAM: THÁCH THỨC VÀ CƠ HỘI**

● **NGUYỄN GIA TRUNG QUAN<sup>1</sup>**

● ThS. **HOÀNG TÔ THƯ DUNG<sup>2</sup>**

<sup>1</sup>Trường Đại học Tài nguyên và Môi trường Thành phố Hồ Chí Minh

<sup>2</sup>Khoa Ngôn ngữ - Văn hóa quốc tế, Trường Đại học Hoa Sen

### **TÓM TẮT:**

Như với bất kỳ tiến bộ công nghệ nào, sự phát triển của trí tuệ nhân tạo (AI) luôn mang đến cả cơ hội và thách thức. Bài viết này phân tích 35 nghiên cứu thực nghiệm được thực hiện từ năm 2015 đến năm 2024 tại Việt Nam, xem xét việc triển khai AI trong giáo dục đại học (HE) Việt Nam. Bài viết trình bày các thách thức như vấn đề đạo đức, kết quả học tập của sinh viên, và sự phát triển của giáo viên, đồng thời khám phá các cơ hội liên quan đến học tập cá nhân hóa, kiểm tra thích ứng và hệ thống gia sư thông minh. Các phát hiện từ nghiên cứu đưa ra các quan điểm hoạt động cho các nhà quản lý cơ sở giáo dục đại học để xây dựng các chính sách và tầm nhìn chiến lược cải thiện việc ứng dụng AI nhằm đạt được tiến bộ và thịnh vượng xã hội. Hơn nữa, bài viết cũng nhằm nâng cao nhận thức về những thách thức và cơ hội của AI trong giáo dục đại học Việt Nam và khuyến khích nghiên cứu thêm trong lĩnh vực này.

**Từ khóa:** AI, trí tuệ nhân tạo, thách thức, cơ hội, giáo dục đại học