

Original Article (Quantified)

Evaluating the effectiveness of artificial intelligence in developing students' entrepreneurial skills

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Receive:

03 March 2025

Revise:

24 April 2025

Accept:

10 June 2025

Keywords:

Artificial Intelligence, Personal Skills, Creative and Critical Skills, Interpersonal Skills, Practical Skills

Abstract

The aim of this study is to evaluate the effectiveness of artificial intelligence in developing students' entrepreneurial skills. The present study is applicable in terms of its purpose, descriptive-survey in terms of data collection, and correlational in terms of the relationships between variables. The statistical population of the present study includes 110 teachers of secondary schools in Districts 11 and 12 of Tehran, selected by purposive sampling method. The collection tool in the present study includes a questionnaire which was distributed among them. The validity of the questionnaire was confirmed by experts and its reliability was confirmed by Cronbach's alpha coefficient. SPSS and PLS software were used to analyze the findings and test the hypotheses. The results showed that artificial intelligence has an impact on the development of entrepreneurial skills such as personal skills, creative and critical skills, interpersonal skills and practical skills. Also, the GOF criterion method was used to fit the overall model; the obtained value was 0.723, which indicates a strong fit of the model.

Please cite this article as (APA): Tarabpur, N., Jafari, S. M. B. and Rahmani, J. (2025). Evaluating the effectiveness of artificial intelligence in developing students' entrepreneurial skills. *Management and Educational Perspective*, 7(1), 340-360.



<https://doi.org/10.22034/jmep.2025.510206.1489>



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Publisher: Research Center of Resource Management Studies and Knowledge-Based Business

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Extended abstract

Introduction

In the era of rapid technological and digital changes, the development of entrepreneurial skills among students has become a fundamental necessity for educational systems. Entrepreneurship education for the new generation is not only a key factor in economic growth and sustainable job creation, but also a prerequisite for adapting to technological changes, innovation, and empowering young people to successfully enter the competitive environment of the future labor market (Somia, & Vecchiarini, 2024). Meanwhile, the emergence of artificial intelligence (AI) with unique capabilities in complex data processing, decision-making, personalization of learning processes, and creation of interactive content has opened new horizons for the transformation of entrepreneurship education (Wan, 2025).

The complexity of entrepreneurship education, with its interdisciplinary nature and need for practical experience, requires new approaches to personalize education, provide interactive scenarios, and simulate real business environments; capabilities that artificial intelligence can potentially provide (Bell & Bell, 2023). However, there is a lack of credible evidence and empirical studies, especially in developing countries and school settings, on the actual effectiveness of this technology in entrepreneurship education. Many existing studies have either focused on the technological dimension or have lacked the measurement of operational and behavioral effectiveness on students. This research gap has doubled the need for scientific studies and field evaluations (Bhatt et al., 2024). Focusing on "Evaluating the Effectiveness of Artificial Intelligence in Developing Students' Entrepreneurial Skills", this research attempts to answer basic questions: To what extent and in what dimensions do AI-based technologies improve entrepreneurial capabilities (including cognitive capabilities, practical skills, and personality-behavioral characteristics) among students? Which components and contextual conditions (such as school environment, digital literacy level, gender, etc.) play a key role in realizing or failing to realize the effectiveness of this process? Can AI fill the gaps in traditional entrepreneurship education and lead to strengthening students' willingness, courage, and readiness to enter the field of entrepreneurship?

Theoretical Framework

Students' Entrepreneurial Skills

Entrepreneurship skills are a multidimensional set of capabilities, attitudes, and knowledge that enable an individual to identify opportunities, create value, and manage resources in various economic, social, and technological contexts. These skills go beyond technical capabilities to include psychological traits (such as risk-taking, independence, perseverance, and self-confidence), cognitive abilities (such as creative thinking, problem-solving, gathering, analyzing, and evaluating information), and social skills (such as effective communication, teamwork, negotiation, and networking). Recent research shows that establishing and nurturing these skills from an early age, especially in educational settings, plays a decisive role in enhancing the career prospects and enabling young people to adapt to changes in the labor market (Ngwenya, 2024).

The Role of Artificial Intelligence in Improving Entrepreneurial Skills

In the last decade, Artificial Intelligence (AI) has become an unparalleled tool for reinventing the way entrepreneurship skills are taught and developed, with researchers calling it a "leapfrogging factor in the entrepreneurial empowerment of the next generation." Integrating smart technologies into the process of educating and training entrepreneurs not only personalizes and accelerates learning, but also has a profound and constructive presence at the four main levels of entrepreneurial competencies (personal characteristics, interpersonal skills, creative/critical skills, and executive/practical skills) (Masadeh et al., 2024).

Najmabadi et al., (2025) examined the impact of artificial intelligence on the development of life skills in students. The present study, using a review approach and qualitative content analysis, examined studies published between 2022 and 2024 on the impact of artificial intelligence on teaching life skills in students. The findings of this study show that AI technology can facilitate the development of cognitive, emotional, and social skills in learners by providing smart learning environments, content personalization, enabling rapid feedback, and enhancing teacher-student interaction. On the other hand, challenges such as the lack of appropriate infrastructure in many schools, inequality in access to technology, weak technical knowledge of teachers, ethical concerns in collecting and analyzing personal data, and lack of localized educational resources are considered obstacles to the effective use of this capacity. The prospective analysis of this article indicates that AI, if properly managed, developing ethical frameworks, and empowering human resources, can play a role as a powerful tool in improving the quality of skill-based education.

Azizi (2025) studied the impact of using AI systems on learners' learning efficiency. The findings of this study show that blockchain technology, visualizations, intelligent teaching systems, adaptation and personalization systems have a positive and significant effect on the efficiency of English language learning, while the effect of assessment and evaluation and teacher robots on improving the efficiency of language learning has been rejected, and it seems that from the perspective of educators and instructors, these systems cannot directly replace the entire teaching staff.

Research Methodology

The present study is applicable in terms of its purpose, descriptive-survey in terms of data collection, and correlational in terms of the relationships between variables. The statistical population of the present study includes 110 teachers from secondary schools in Districts 11 and 12 of Tehran, selected by purposive sampling method and a questionnaire was distributed among them. The collection tool in the present study includes a standard questionnaire, the validity of which was confirmed by experts and its reliability was confirmed by Cronbach's alpha coefficient.

Research findings

SPSS and PLS software were used to analyze the findings and test the hypotheses. The results showed that artificial intelligence has an impact on the development of entrepreneurial skills such as personal skills, creative and critical skills, interpersonal skills, and practical skills. Also, the GOF criterion method was used to fit the overall model; the value obtained was 0.723, which indicates a strong fit of the model.

Conclusion

The present study was conducted with the aim of evaluating the effectiveness of artificial intelligence in developing students' entrepreneurial skills. The results of this study are consistent with the results of Najmabadi et al., (2025), Mehdizadeh Mahali (2025), Sadeghi et al., (2025), Li (2025), Wan (2025), Azizi (2025), Rostam zadeh ganji & jayervandi (2025), and Pourshahabi (2023). Najmabadi et al., (2025) showed that AI technology can pave the way for the development of cognitive, emotional, and social skills in learners by providing smart learning environments, content personalization, enabling rapid feedback, and enhancing teacher-student interaction. On the other hand, challenges such as the lack of appropriate infrastructure in many schools, inequality in access to technology, weak technical knowledge of teachers, ethical concerns in collecting and analyzing personal data, and lack of localized educational resources are considered obstacles to the effective use of this capacity. The



prospective analysis of this article indicates that AI, if properly managed, developing ethical frameworks, and empowering human resources, can play a role as a powerful tool in improving the quality of skill-based education.

According to the results obtained, it is suggested that entrepreneurship education programs be designed based on blended learning and using simulated environments based on AI. These environments should represent real issues and challenges of the Iranian labor market and innovative businesses in a localized manner so that students, while interacting with realistic scenarios, practice problem solving, decision making, and analyzing real situations.