International Journal of Information and Communication Technology Education
Volume 22 • Issue 1 • January-December 2026

Construction and Empirical Analysis of an Artificial Intelligence-Based Educational Assessment Model

Qing Wang
https://orcid.org/0009-0008-0824-8138
Henan Open University, China
Received: July 23rd, 2025 | **Accepted:** December 30th, 2025

ABSTRACT

With the rapid development of artificial intelligence (AI), traditional educational evaluation models are increasingly inadequate in data processing, dynamic feedback, and personalized analysis—limiting their ability to support quality monitoring in adult and vocational education. This study addresses this gap by constructing an AI-based educational assessment model tailored to diverse learning contexts. First, a multi-level, quantifiable evaluation framework grounded in data-driven principles is developed, and then machine learning and deep learning algorithms are optimized to enhance model adaptability and accuracy. Empirical analyses verify the model's performance in evaluating learning processes and outcomes, demonstrating its advantages in improving efficiency and feedback precision. The discussion highlights practical challenges and refinements, emphasizing the model's value in providing scientific decision support for educators and administrators in adult education settings.

KEYWORDS

Artificial Intelligence, Educational Evaluation, Machine Learning, Deep Learning, Model Construction, Empirical Analysis

INTRODUCTION

As an indispensable link in the education system, educational evaluation has always assumed the key functions of monitoring teaching effect, guiding teaching reform and promoting students' all-round development. The traditional evaluation models are mostly static tests and standardized tests. Although the quantitative measurement of learning achievements has been achieved to some extent, there are still many shortcomings in dynamic process tracking, individual difference identification and personalized feedback support. With the advent of the information age, educational needs are increasingly diversified and personalized, and traditional assessment methods, which often rely on static testing, are increasingly unable to track the dynamic and individualized progress of students. For instance, traditional systems fail to adjust learning paths in real-time, whereas artificial intelligence (AI)-based models, by utilizing continuous data streams (e.g., behavioral patterns, physiological responses), dynamically track and adjust learning strategies to meet students' evolving needs.

At the same time, the rapid rise of AI technology has brought brand-new development opportunities to the field of educational evaluation. AI has powerful data processing, pattern

DOI: 10.4018/IJICTE.399169

recognition and predictive inference capabilities, and can mine deep-seated laws and characteristics in large-scale, complex, and changeable educational data (Demartini et al., 2024). Applying AI to education evaluation can not only improve the scientificity and objectivity of evaluation but also help to realize real-time monitoring and dynamic adjustment of learning process. AI-driven educational evaluation systems can further integrate multi-modal data sources, such as students' eye movement trajectories during online learning (Tao et al., 2025) and physiological signals reflecting emotional changes (Naregalkar et al., 2025), to achieve a more nuanced portrayal of learning states. These technologies not only break through the limitations of traditional paper-and-pencil tests but also enable real-time intervention in the learning process, such as automatically triggering targeted tutoring resources when a student's confusion is detected (Zambrano et al., 2024).

However, the existing research on education evaluation based on AI mostly remains at the stage of theoretical modeling or preliminary application verification, lacking comprehensive research with strong systematicness and full support of empirical data. At the same time, how to design an evaluation model that conforms to the educational law and can give full play to the advantages of AI technology is still an important challenge in the current academic and educational practice fields. In view of this situation, this paper aims to put forward an operational and scalable AI education evaluation model for practical application requirements and verify its effectiveness and applicability through systematic empirical research. To broaden the global perspective, recent Western research has highlighted the integration of social robots and generative AI into classrooms, demonstrating their potential for personalization and adaptive learning (Verhelst et al., 2025). Furthermore, empirical evidence shows that students' intentions to use AI in academic contexts are shaped by ethical transparency and cultural variation, suggesting the importance of considering cross-cultural adoption factors (Lavidas et al., 2024).

LITERATURE REVIEW

Despite advancements in AI-driven educational evaluation, most research still focuses on theoretical modeling and isolated applications. While technologies like eye-tracking and facial emotion recognition (Tao et al., 2025; Naregalkar et al., 2025) have made strides, there remains a significant gap in integrating these multi-modal data sources into a cohesive evaluation framework. This study bridges this gap by demonstrating how multi-modal data, beyond single-model applications, can be utilized for real-time, personalized feedback in educational settings. Huang et al. (2024) proposed a long short-term attentional neuro-cognitive diagnostic model that enables fine-grained, dynamic monitoring of student's skill-growth and process-level learning states within intelligent tutoring systems. Gul (2025) then put forward a student achievement prediction model based on supervised learning, which realized the early prediction of academic performance through learning behavior data and promoted the development of data-driven evaluation methods.

Ding et al. (2025) developed a personalized learning path optimization model based on an enhanced deep neural network that integrates learner behavior and cognitive style, which allows dynamic real-time adjustment of evaluation feedback and significantly improves pertinence and adaptability. These technologies not only break through the limitations of traditional paper-and-pencil tests but also enable real-time intervention in the learning process, such as automatically triggering targeted tutoring resources when a student's confusion is detected (Jia & He, 2024). In addition, Naikar (2024) proposed an intelligent scoring model of subjective questions based on natural language processing, which realized the automatic evaluation of unstructured text answers and expanded the application scope of AI in educational evaluation.

Facing the challenge of the educational big data environment, Qu et al. (2024) proposed a comprehensive evaluation model integrating knowledge graphs and learner engagement tracking, which realizes multi-dimensional tracking of students' cognitive process and strengthens the formative function of evaluation. Furthermore, Stasolla (2025) developed a dynamic evaluation platform based on