

AI Empowerment of Teachers' Blended Teaching Ability: An Empirical Analysis of the MATE Evaluation System

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Abstract: This study aims to explore the role of the MATE Multi-Assessment Teaching Evaluation System in empowering teachers' blended teaching abilities through AI. By analyzing questionnaire data from 20 teachers participating in the MATE teaching ability experiment using SPSS, the study evaluated the performance of the MATE system in teaching effectiveness, student engagement, and teacher improvement. The results showed that the MATE system positively impacted teachers' teaching abilities and students' learning experiences across multiple dimensions. This research provides data support for further optimization of the MATE system and empirical evidence for the application of AI technology in education.

Keywords: AI Empowerment; Blended Teaching Ability; MATE Evaluation System.

1. Introduction

With the rapid development of information technology, the application of artificial intelligence (AI) in education is becoming increasingly widespread. Blended teaching, as an essential form of modern teaching, combines the advantages of traditional classroom teaching and online teaching, gradually becoming a key method to improve teaching effectiveness and student learning experience. However, teachers face numerous challenges in the practical application of blended teaching, such as effectively evaluating teaching effectiveness, understanding student needs, and improving teaching methods.

The MATE Multi-Assessment Teaching Evaluation System is an AI-based teaching evaluation tool designed to provide comprehensive teaching feedback to help teachers better understand students' learning conditions and improve teaching strategies. Using a private application-oriented undergraduate college in Shaanxi as an example, this study explores the practical experience of promoting teacher development based on the MATE Multi-Assessment Teaching Evaluation Mechanism. By analyzing the actual situation of the school's teaching evaluation and combining it with the theoretical basis of the MATE mechanism, the study discusses the implementation methods and teacher development mechanisms, and finally, through empirical research, investigates the specific performance of the MATE system in empowering teachers' blended teaching abilities, providing a basis for further optimization and offering insights and references for other higher education institutions.

2. Implementation Methods

Xi'an Eurasia University has taken a series of orderly steps to establish a comprehensive and objective teacher teaching evaluation system.

(1)The university established the Teaching Development and Evaluation Committee. This committee, composed of members with teaching management experience, educational background, and extensive teaching experience, including

university leaders, teaching managers, subject experts, and senior teachers, is responsible for formulating and improving the teacher teaching evaluation system and coordinating the evaluation work.

(2) The university integrated the design of the MATE Multi-Assessment Evaluation System. The university incorporated the MATE multi-assessment evaluation form design into several evaluation links, including student evaluations, peer evaluations, and teacher teaching file reviews, forming a multi-level, multi-dimensional evaluation mechanism.

(3)The university designed and distributed questionnaires to students through the macos quality teaching platform and MATE dual questionnaires to collect their opinions and evaluations of teachers' teaching. The questionnaire covered questions about teaching content, teaching methods, classroom atmosphere, etc.

(4)The university invited experienced and knowledgeable teachers to form peer evaluation teams to evaluate the teaching of the teachers being assessed, ensuring objectivity and fairness in the evaluations.

(5)The university organized teachers to participate in various levels of teaching observations and professional training activities, based on MATE observation data, to promote exchanges and cooperation among teachers, expand teaching perspectives, and improve teaching effectiveness.

3. Research Methods

This study first adopted experimental data from two semesters of teacher teaching. Data collection for the MATE teaching evaluation system was conducted at the end of each semester. Teachers adjusted their teaching based on the first semester's data provided by the MATE evaluation system. After two semesters of MATE teaching evaluation experiments, all teachers using the MATE system were surveyed. The survey, using a questionnaire method, issued 22 questionnaires, with 10 valid questionnaires after data cleaning and screening. The questionnaire included 10 closed questions and 2 open questions, using a Likert five-point scale

for scoring. The data were analyzed using SPSS software for reliability analysis, validity analysis, correlation analysis, regression analysis, and variance analysis.

4. Data Analysis

(1) Reliability Analysis

According to the reliability analysis results, the Cronbach's α coefficient is 0.949, indicating high internal consistency of the questionnaire. This means that the correlation between the items in the questionnaire is high, reliably reflecting teachers' experiences with the MATE system.

Table 1. Reliability analysis

Sample Size	Number of Items	Cronbach's α Coefficient
10	10	0.949

(2) Validity Analysis

The factor analysis results show that the communalities of the questionnaire are high, with a cumulative variance explanation rate of 81.15%, indicating that the questionnaire can well reflect the performance of the MATE system in different dimensions.

Table 2. The factor analysis results

Item	Factor 1	Factor 2	Communality
1	0.35	0.70	0.612
2	0.64	0.46	0.625
3	0.81	0.14	0.681
4	0.74	0.50	0.805
5	0.24	0.89	0.850
6	0.23	0.96	0.967
7	0.79	0.56	0.934
8	0.59	0.67	0.804
9	0.93	0.20	0.903
10	0.79	0.56	0.934

(3) Correlation Analysis

The correlation analysis results show that the MATE system significantly impacts teachers' teaching improvement

in multiple dimensions, particularly in timely identifying teaching issues and promoting student interaction.

Table 3. The correlation analysis

Item	Average	Standard Deviation	7. Through the MATE system, I can identify and solve teaching problems promptly.	8. The MATE system performs well in promoting student participation and interaction.
7	4.10	0.88	1	0.88**
8	3.90	0.74	0.88**	1

* $p < 0.05$ ** $p < 0.01$

(4) Regression Analysis

The regression analysis indicates that the feedback from the MATE system significantly impacts teachers' improvement of

teaching methods. Particularly, the feedback provided by the MATE system plays an important role in improving teaching effectiveness and understanding student needs.

Table 4. The regression analysis

Item	Regression Coefficient	t-value	p-value	VIF
Constant	-0.05	-0.02	0.983	-
4	-0.33	-0.35	0.741	7.45
5	0.60	0.80	0.470	3.12
7	0.23	0.16	0.883	13.51
8	0.05	0.04	0.969	6.31
9	0.43	0.47	0.663	4.23

(5) Variance Analysis

The variance analysis shows significant differences in the frequency and satisfaction of teachers using the MATE

system across different items. This indicates that different teachers may have different experiences and feedback when using the MATE system.

Table 5. The variance analysis

Option	Sample Size	Mean	Standard Deviation	F-value	p-value
2	1	4.00	-	2.480	0.158
3	3	3.00	-		
4	4	4.00	0.82		
5	2	4.50	0.71		

5. Conclusion from Questionnaire Data

Through data analysis, this study found that the MATE Multi-Assessment Teaching Evaluation System positively impacts teachers' blended teaching abilities in several areas.

(1)The MATE system significantly improves teaching effectiveness. Teachers generally believe that the system objectively and impartially reflects their teaching effectiveness and provides valuable feedback to help them improve their teaching methods. With feedback from the MATE system, teachers can identify and address teaching issues promptly, thereby improving overall teaching effectiveness.

(2)The MATE system performs well in promoting student participation and interaction. Teachers found that using the MATE system significantly increased students' participation and interaction. This not only helps to enhance students' learning enthusiasm but also strengthens the interaction and communication between teachers and students.

(3)The MATE system helps teachers better understand students' learning needs and feedback. Through the detailed analysis reports provided by the system, teachers can clearly understand students' confusion and needs during the learning process and adjust their teaching strategies accordingly to improve teaching effectiveness.

(4)The survey results show that most teachers are satisfied with the MATE system and are willing to recommend it to other teachers. This indicates that the MATE system performs well not only in teaching effectiveness but also in user experience and teacher satisfaction.

6. Conclusion

Through empirical analysis, this study validates the positive role of the MATE Multi-Assessment Teaching Evaluation System in empowering teachers' blended teaching abilities through AI. The results indicate that the MATE system not only improves teachers' teaching effectiveness but also promotes student participation and interaction. Future research can further explore the application of the MATE system in different teaching environments and optimize its functions to better serve educational practices. Additionally, the practical experience of Xi'an Eurasia University provides valuable insights and references for other higher education institutions.

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