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Research on the Reform of the Microteaching Course for Master of Education with the Support of Generative Artificial Intelligence Technology

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ABSTRACT

"Microteaching" serves as a core practical course for Master of Education students. Traditional teaching models face challenges such as vague and delayed feedback, rigid teaching resources, poor situational simulation, and insufficient innovation cultivation, making them inadequate for the professional training needs of modern educators. To address these issues, this study focuses on Master of Education (Chinese) candidates in higher education institutions, employing a controlled experimental approach to implement AI-enhanced curriculum reform. Through modular project design, generative AI is deeply integrated into the entire teaching process, including instructional design, case resources, situational simulation, and personalized tutoring, thus establishing a step-by-step skill development system from foundational knowledge to innovative practice. Evaluation results demonstrate that learners under the AI-enhanced model show significant improvements in both microteaching-specific skills and comprehensive applications, with overall teaching effectiveness markedly optimized compared to traditional methods. The research indicates that generative AI provides robust support for precise and personalized cultivation of teaching skills in Master of Education programs. This study not only enriches theoretical research on the deep integration of technology and teacher education but also offers replicable practical paradigms for digital transformation in similar courses.

KEYWORDS

Generative AI; Microteaching; Master of education; Curriculum reform

1 Introduction

As a core practical component of the Master of Education program, Microteaching bridges abstract pedagogical theories with real-world Chinese language classroom practices. Through controlled, repeatable, and refined skill training, this course equips pre-service teachers with systematic competencies in designing, implementing, and evaluating Chinese language instruction. The quality of this training directly determines the professional foundation of future Chinese language educators.

However, the traditional microteaching model is encountering significant practical challenges. Current practices predominantly rely on instructors' limited observational experience and peer evaluations, resulting in feedback that tends to be generalized and fails to thoroughly analyze complex interactions in Chinese language classrooms. The rigid teaching framework and scenario-based simulations that lack the dynamic interactivity of real classroom settings struggle to meet the growing demands for personalized development and innovative teaching approaches among master's students in education.

The rapid advancement of generative artificial intelligence (GenAI) has created transformative opportunities for teacher education reform in recent years. With its capabilities in intelligent content generation, highly realistic scenario simulation, and multidimensional data analysis, GenAI provides robust technical support for achieving precise, personalized, and context-driven reforms in Chinese microteaching. This study focuses on two core questions: How can GenAI address the traditional challenges in microteaching? And how can we establish an AI-powered framework for microteaching reform?

This study conducted a two-semester (16-week) empirical research with 20 Master of Education (Chinese) students from a university in Beijing, aiming to explore the deep integration path between generative AI and microteaching in Chinese language education. The goal was to establish a new teaching paradigm that deeply integrates theory and practice, providing a replicable practical model for the reform of Master of Education programs.

2 Challenges of Traditional Microteaching Courses

Since its introduction to China in the 1980s, microteaching has been implemented in schools at all levels for many years, making significant contributions to the training of teacher candidates. However, in recent years, the traditional microteaching model has also revealed certain issues in areas such as feedback mechanisms, teaching resources, situational simulation, and innovation cultivation, particularly its difficulty in meeting the professional training needs of current education master's programs. In terms of teaching skills training, traditional microteaching courses are constrained by the number of teachers and teaching facilities, often adopting a uniform content, standard, and process training approach. Scholars have pointed out that "local teacher training institutions face issues such as uneven distribution of teaching behaviors and a focus on linguistic behaviors in microteaching" [1]. In terms of teaching feedback,

it generally relies on a single evaluation by teachers, often focusing on macro processes, and the long feedback cycle can lead to inadequate value recognition and weak teacher guidance capabilities, among other teaching issues [2]. Case resources are mostly rigid classic demonstration class videos, lacking samples of new teaching models, sufficient convenience in obtaining cases, and adequate coverage of genres and teaching segments. A large number of excellent exemplary microteaching archives are "information silos" [3]. In terms of situational simulation, microteaching skill training either involves teaching without students or having other trainees play the role of students, failing to replicate the dynamic generation of real classrooms, resulting in weak students' ability to handle classroom-generated issues. Additionally, limited by their own experience and rigid cases, students' teaching practice in microteaching tends to be homogenized, lacking cross-media resource integration and deep textual value exploration, making it difficult to meet the requirements of cultivating core literacy in Chinese language, and limiting the development of innovative awareness and practical abilities.

3 The Role of Generative AI in Reconstructing Microteaching of Chinese Language

In the current curriculum reform, integrating generative AI into the "Microteaching" course can provide effective solutions to the challenges faced by traditional teaching, thereby enhancing the training quality of education master's students. In an ideal microteaching reform course, the teaching environment is an "AI-powered smart classroom" [4] based on AI technology and multimodal educational data. Here, AI serves not merely as a tool but as a transformative force that reshapes the entire process of teaching skill training.

In instructional design, AI can generate foundational solutions such as classical Chinese annotation interpretations, tiered inquiry question chains, and personalized writing scaffolds tailored to the characteristics of different literary genres like classical poetry and modern texts. Trainees can optimize these solutions according to their own teaching styles, which not only lowers the threshold for instructional design but also reserves space for innovation, effectively addressing the challenge of homogenization. At the level of teaching behavior, AI has transformed from lagging feedback to real-time diagnostics. The microteaching intelligent system can capture pronunciation, rhythm, and even emotional attitudes in teaching language through speech analysis, providing instant prompts for issues encountered by students during instruction. With image recognition, it can also quantify the logicality of blackboard writing, the effectiveness of classroom interactions, and even detect shortcomings in teaching demeanor and eye contact, enabling graduate students to quickly adjust during training and avoiding the drawbacks of traditional feedback fading and delayed improvement. In terms of teaching case resources, AI can break through the limitations of traditional rigid cases by generating new curriculum standard-oriented case libraries covering all genres and teaching stages, adapting to different academic levels and learning conditions. Simultaneously, it deconstructs cases into microteaching units, annotating key design logic, significantly enhancing resource relevance and transferability. Currently, microteaching systems based on virtual reality technology have already been applied in teaching practice [5]. Therefore, in classroom simulation and personalized tutoring, AI-assisted virtual classrooms can recreate the dynamic generative nature of real Chinese language teaching, simulating complex scenarios such as students' divergent text interpretations and sudden controversial issues, thereby forcing graduate students to improve their classroom management and emergency response capabilities. Furthermore, AI can precisely identify students' weaknesses and automatically deliver tailored training tasks and resources. It also assists in analyzing microteaching videos, guiding students to write structured reflection reports from the perspective of implementing core Chinese language competencies, thereby shifting teaching skills from mechanical imitation to active construction. The comparison in Table 1 demonstrates the paradigm shift in the entire teaching skills training process between traditional microteaching and AI-enhanced microteaching.

Table 1 Comparison between Traditional Microteaching and Generative AI Empowered Microteaching

Characteristic Dimension	Traditional Microteaching	Microteaching with Generative AI
Instructional Design	Students tend to follow fixed templates, lacking room for innovation.	Supports personalized optimization, lowers the threshold for instructional design, and reserves space for innovation
Teaching Feedback	Relying on a single teacher evaluation, with delayed feedback and generalized content	Real-time diagnosis of teaching language, blackboard writing, and teaching demeanor
Case Resources	Most are classic demonstration class recordings, lacking microteaching analysis.	Generate a full-text, full-process case library with microteaching analysis and annotation, and customize personalized cases as needed
Scenario Simulation	Lack of authentic student interaction prevents the restoration of classroom dynamics.	Building Virtual Classroom, Restoring Real Teaching Dynamics, Strengthening Emergency Control Ability
Personalized Counseling	Lack of targeted support makes it difficult to address students' individual weaknesses	Pinpoint students' skill gaps and automatically push training tasks and resources
Teaching Reflection	Relying on self-summarization, reflection tends to be superficial	Intelligent Analysis of Teaching Record, Extracting Key Questions, Guiding Students to Write Structured Reflection Report

4 Reforming the Design and Implementation of Courses

Building on generative AI's potential to address challenges in traditional teaching, this study designed and implemented a reform practice plan for the "Microteaching" (Chinese) course. The curriculum reform seamlessly integrates generative AI into the entire microteaching process of Chinese language instruction, enhancing the teaching subjectivity and critical thinking of education master's students while leveraging AI's precise auxiliary value and avoiding technological dependency. The course targets 20 first-year graduate students in the Chinese language specialization at a Beijing university, spanning one semester (totaling 32 class hours). Adopting a modular project-based design, it establishes a step-by-step training framework for microteaching skills from foundational cognition to innovative practice. Existing research generally categorizes microteaching into four basic skills: language, explanation, introduction, and questioning [6]. Considering the unique characteristics of Chinese language classrooms, we added demonstration skills to delineate the course's teaching modules. The detailed structure of the reformed course is shown in Table 2.

Table 2 Curriculum Structure of Microteaching after Reform

Module number	Theme	Learning Target	Integrating Generative AI into Teaching Activities
1-2	Basic Cognition	Master the Basic Requirements and Evaluation Standards of Chinese Microteaching	AI-generated skill interpretation manual; microteaching segment for assisting in deconstructing classic cases
3	Language Skill	Improving the Accuracy, Emotionality and Logic of Language in Chinese Teaching	AI real-time diagnosis of pronunciation, rhythm, and emotional delivery in language expression
4-5	Import Skills	Master multiple import methods to quickly focus on the class	AI generates differentiated introduction plans based on teaching content; simulates student feedback during introduction
6-8	Teaching Skills	Improving the efficiency of knowledge teaching and accurately breaking through the key and difficult points of teaching	AI-generated text interpretation framework; assists in designing teaching gradients and provides real-time teaching diagnostics
9-11	Questioning Skills	Master the design of questions to stimulate students' thinking interaction	AI generates question chains at different levels; simulates student response scenarios
12-14	Demonstration Skills	Master the teaching demonstration method of Chinese language and strengthen the standardization and guidance	AI generates reading sample paragraphs, blackboard design templates, etc.; provides feedback on the appropriateness of demonstration actions and expressions
15-16	Integrated Showcase	Complete the microteaching demonstration	AI simulates complete classroom student feedback to assist in microteaching video review and analysis

Table 2 presents eight modules that form a logically structured, step-by-step training system, creating a comprehensive skill development pathway from foundational understanding to systematic application. The first two foundational modules establish the theoretical and methodological framework for the entire course, utilizing AI to visualize skill systems and structurally analyze case studies, helping students rapidly develop systematic understanding of microteaching skills in Chinese language education. The five intermediate specialized skill modules focus on core dimensions of microteaching such as language, introduction, and instruction, enabling one-on-one precision breakthroughs. Each module leverages AI-powered scenario-based empowerment to address the pain point of imprecise skill refinement in traditional training. The comprehensive demonstration module achieves skill integration through AI-enhanced consolidation and real-scenario simulation, facilitating students' transition from mastering individual skills to applying comprehensive competencies. In terms of teaching evaluation, AI collects students' classroom behaviors and employs big data analysis to propose detailed evaluation plans [7], providing effective support for teachers' classroom feedback. This deep integration of modular design and AI empowerment breaks the rigid model of traditional microteaching, ensuring systematic and precise skill training while fully respecting individual developmental differences among graduate students, thereby providing effective support for their step-by-step, personalized improvement of teaching skills.

5 Teaching Effect Evaluation

To scientifically validate the practical effectiveness of generative AI in empowering microteaching reform for Chinese language instruction, this study employed a mixed-methods approach combining quantitative and qualitative research for systematic evaluation. The study involved 20 master's students in education, with 10 students from the 2025 cohort using AI-enhanced teaching methods as the experimental group and 10 students from the 2024 cohort using traditional teaching methods as the control group. The core objective was to assess the reform's actual impact on enhancing teaching skills, optimizing learning experiences, and fostering innovative awareness, with the evaluation spanning the

entire 32-hour course period.

The quantitative evaluation primarily utilizes a 5-point Likert scale to conduct pre-and post-class comparative surveys, supplemented by microteaching instructor ratings for multidimensional validation. The scale assessment (Table 3) measures students' self-evaluation proficiency and confidence across six core dimensions: language skills, introduction techniques, instructional delivery, questioning abilities, demonstration skills, and comprehensive application capabilities. Pre-class data revealed no significant differences in skill scores between the two groups ($P>0.05$), with both groups demonstrating common weaknesses in specific skills and insufficient comprehensive application. Post-class data showed marked differentiation, with the experimental group achieving statistically significant improvements across all dimensions ($P<0.01$), particularly in questioning skills and comprehensive application capabilities. This progress directly correlates with students' advantage in utilizing generative AI tools for creative planning and simulated teaching.

Table 3 Comparison Table of Quantitative Assessment of Microteaching Skills

Evaluation dimensions	Average score before class in the experimental group (n=10)	Average score after class in the experimental group (n=10)	Average score before class in the control group (n=10)	Average score after class in the control group (n=10)	growth rate in experimental group	growth rate in control group
Language skill	3.2	3.8	3.3	3.7	+18.8%	+12.1%
Import skills	3.1	3.7	3.2	3.5	+19.4%	+9.4%
Teaching skills	3.3	3.9	3.4	3.8	+18.2%	+11.8%
Questioning skills	3.0	4.0	3.1	3.4	+33.3%	+9.7%
Demonstration skills	3.2	3.8	3.2	3.7	+18.8%	+15.6%
Comprehensive Application	2.9	4.0	3.0	3.5	+37.9%	+16.7%

In the expert evaluation phase, professional instructors assessed two student groups' microteaching demonstrations using standardized criteria across four dimensions: skill standardization, procedural completeness, interactive effectiveness, and pedagogical innovation. The results (Table 4) showed the experimental group scored 87 out of 100, achieving an 8.7% improvement over the control group's 80. Notably, the experimental group demonstrated significant advantages in interactive design rationality and innovative teaching awareness.

Table 4 Comparison of Expert Ratings for Microteaching Demonstration

Evaluation Dimensions	Average score of the experimental group (n=10)	Average score of the control group (n=10)	Improvement rate in the experimental group compared to the control group
Skill Specification	86	81	+6.2%
Link Integrity	85	79	+7.6%
Interactive Validity	90	80	+12.5%
Teaching Innovation	90	78	+15.4%
Composite Average	87	80	+8.7%

The qualitative evaluation was conducted through methods such as teaching reflection journal analysis and focus group interviews. In the focus group discussions, students generally acknowledged the value of AI empowerment, noting that "AI-generated teaching design plans provided better creative inspiration" and "AI simulations offered improved methods for understanding student learning conditions." They also proposed improvement suggestions, including optimizations for the compatibility of certain AI tools.

6 Conclusion

This study addresses core challenges in traditional microteaching courses by developing an AI-enhanced curriculum reform framework. Through controlled experiments with 20 education master's students, the research validated the scientific validity and effectiveness of the reform. The findings demonstrate that AI-powered modular microteaching design effectively promotes stepwise skill development, particularly in questioning techniques and comprehensive application abilities. The experimental group showed significantly greater improvement than the control group, highlighting the transformative potential of generative AI in creative design and simulated teaching scenarios.

This study provides a replicable practical model for the digital transformation of similar microteaching courses in practice, while theoretically enriching research on the deep integration of technology and teacher education. It validates the core role of AI as a "teaching scaffold" in enhancing learners' subjectivity and improving the precision of teaching skills.

It should be noted that this study has a limited sample size and research duration. Future studies could expand the sample scope and extend the research period to further validate the long-term effectiveness of the proposed approach. Additionally, exploring integration pathways between generative AI and more teaching skills could optimize technical adaptability. Overall, generative AI-enhanced microteaching provides new momentum for the training of education

master's students. Future efforts should focus on effectively combining technological advantages with teachers' subjectivity to provide robust support for cultivating high-level Chinese language teachers.

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