
Exploration and Practice of Higher Vocational Classroom Teaching Empowered by AI Technology

Zhibin Ye*

Zhejiang Institute of Communications, Hangzhou 311112, Zhejiang, China

**Author to whom correspondence should be addressed.*

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Abstract: The rapid development of AI technology has brought unprecedented challenges as well as tremendous transformation opportunities to higher vocational classroom teaching. Based on this, this paper deeply explores the significance of higher vocational classroom teaching empowered by AI technology, the existing problems in higher vocational classroom teaching, the practical paths of AI technology-empowered higher vocational classroom teaching, and the practical cases of AI technology-empowered higher vocational classroom teaching. It aims to provide valuable references for higher vocational education to adapt to the development of the times, innovate talent training models and improve classroom teaching quality through strategies such as innovating teaching methods, enriching teaching resources, strengthening teaching interaction and optimizing teaching evaluation.

Keywords: AI technology; higher vocational classroom; high-quality online course

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1. Introduction

At present, the rapid development of artificial intelligence technology is profoundly reshaping the ecology of various industries, and the education field cannot be separated from this transformation trend. As an important carrier for cultivating applied talents, higher vocational education undertakes the important task of delivering high-quality skilled talents to the society, and its classroom teaching model is in urgent need of transformation and upgrading^[1]. Relying on core advantages such as data analysis, intelligent interaction and personalized recommendation, AI technology provides strong support for the innovation of higher vocational classroom teaching: on the one hand, it breaks the temporal and spatial limitations of traditional teaching and realizes the optimal integration and efficient application of teaching resources; on the other hand, it accurately matches students' learning needs and characteristics and pushes personalized learning paths; at the same time, it can construct simulated professional scenarios and strengthen students' practical application and problem-solving abilities^[2]. Based on this, systematically exploring the implementation paths and practical strategies of AI-empowered higher vocational classroom teaching is not only an inevitable choice to keep up with the pace of the times, but also a core grasp to consolidate the school-running quality of higher vocational education and enhance the competitiveness of talent training^[3].

2. Existing Problems in Higher Vocational Classroom Teaching

2.1. Traditional and Single Teaching Methods

Many higher vocational teaching activities still adopt the traditional teaching form, which not only weakens students' main role in teaching activities, but also fails to effectively mobilize their subjective initiative. It also leads to students' negative emotions such as learning fatigue and weariness of study, thus reducing their learning enthusiasm and affecting teachers' teaching effects^[4].

2.2. Scarce and Outdated Teaching Resources

Higher vocational education focuses on practicality and applicability, which requires rich teaching resources to support teaching. However, at present, the teaching resources of many higher vocational colleges are relatively scarce, especially practical teaching resources. The school's experimental equipment, training venues and other resources are limited, which cannot meet the practical needs of all students^[5].

2.3. Insufficient Teaching Interaction

In traditional classrooms, teachers mainly teach through classroom questioning and answering, which not only reduces students' learning interest, but also makes it difficult for students to concentrate on listening. Such teaching methods make it hard for teachers to understand each student's learning situation and needs, and also prevent effective communication and exchange among students, resulting in the lack of students' sense of teamwork and communication skills^[6].

2.4. Unscientific Teaching Evaluation

Previous teaching evaluation mostly takes exam scores as the criterion, with a single evaluation dimension, which is difficult to objectively present students' learning trajectories and actual effects. It also makes students overemphasize scores and ignore the improvement of knowledge application ability.

3. Practical Paths of Higher Vocational Classroom Teaching Empowered by AI Technology

3.1. Innovate Teaching Methods to Realize Personalized Teaching

AI technology provides strong support for the innovation of teaching methods. Through in-depth analysis of students' learning data, such as learning progress, knowledge mastery, learning styles and so on, it can accurately locate each student's learning characteristics and needs, and provide teachers with detailed student portraits^[7]. On this basis, teachers can formulate personalized learning plans and teaching programs for different students, and provide targeted learning resources and more effective tutoring. Taking the high-quality online course Automobile Marketing Planning for the major of Automobile Technical Service and Marketing as an example, the course uses AI technology to build an intelligent teaching system and generate personalized learning paths according to students' learning data^[8]. Students with a weak foundation will receive more explanations of basic knowledge and basic exercises, while students with spare capacity can obtain extended learning content and challenging project tasks. For example, when explaining automobile market segmentation, the system pushes case analyses of different difficulty levels according to students' learning situations, allowing students to deepen their understanding of knowledge points by analyzing practical cases, and adjust teaching strategies in real time according to learning progress and feedback to realize teaching students in accordance with their aptitude^[9].

3.2. Enrich Teaching Resources to Build a Dynamically Updated Resource Library

AI technology can help build a rich and diverse, dynamically updated teaching resource library. On the one hand, AI tools are used to automatically generate teaching resources such as intelligent courseware, virtual experiments and online tests, which are updated and optimized in real time according to teaching needs and student feedback. On the other

hand, cooperate with enterprises to integrate actual project and case resources and transform them into content suitable for teaching. Taking the high-quality online course Automobile Electrical Equipment Maintenance for the major of Automobile Inspection and Maintenance as an example, teachers use AI code generation tools to provide students with automobile electrical equipment fault analysis exercises and project cases of different difficulty levels. At the same time, in cooperation with automobile maintenance enterprises, actual automobile electrical equipment maintenance projects and cases are imported into the teaching resource library, allowing students to learn real project scenarios and maintenance methods through the online platform^[10]. The AI system can also classify and sort out cases and data, provide accurate learning resource recommendations for students, and ensure the timeliness and cutting-edge nature of teaching content^[11].

3.3. Strengthen Teaching Interaction to Build an Intelligent Interactive Learning Community

Teachers can strengthen communication and exchange with students on the interactive learning community platform equipped with AI technology, so as to better solve the difficulties and problems encountered by students. Among them, in the community, teachers can use the AI intelligent interaction system to communicate with students in real time through text, voice, video and other ways, so as to better solve the immediate problems of students; in group cooperation, AI technology can be used to monitor the progress of the group in real time, so as to dynamically adjust teaching strategies^[12]. For example, in the high-quality online course Automobile Maintenance Business Reception for the major of Automobile Technical Service and Marketing, teachers regularly release discussion topics such as “How to Improve Customer Satisfaction of Automobile After-sales Service” by using AI topics, and let students discuss in groups, so as to better broaden their horizons. In this way, teachers can not only understand the contribution and participation of each member, but also provide targeted materials for students, so as to promote their all-round development^[13].

3.4. Optimize Teaching Evaluation to Establish a Diversified Evaluation System

Teachers can track and analyze students' learning data throughout the process through AI technology, so as to fully understand students' learning behaviors, attitudes, abilities and achievements, and thus evaluate students better^[14]. For example, in the high-quality online course Automobile Marketing Technology for the major of Automobile Technical Service and Marketing, teachers not only record data such as students' video watching duration, courseware browsing times, online test scores, and comments in the discussion area, but also record the number of discussions and comments of students on the problems they do not understand, and more record the completion of students in different projects. In this way, teachers can observe students comprehensively and collect the evaluations of industry experts on students, so that students can better understand their own advantages and disadvantages and make effective corrections^[15].

4. A Case of Higher Vocational Classroom Teaching Empowered by AI Technology — Taking the Major of Automobile Technical Service and Marketing as an Example

4.1. Experimental Design

Two parallel classes with about 45 students each taking the Automobile Marketing Technology course of the 2022 grade were selected. The experimental class adopted the AI-empowered teaching model (including AI personalized teaching, AI virtual simulation + physical operation practice, and AI diversified evaluation system), and the control class adopted the traditional teaching model (including traditional unified teaching, pure physical operation practice, and teachers' manual evaluation system). With one semester (18 weeks) as the experimental cycle, the changes of dependent variables such as course assessment scores, skill certificate pass rate and learning satisfaction were observed.

4.2. Implementation Process

4.2.1. Pre-class learning situation diagnosis

The experimental class carried out a pre-class test with the help of the “AI Learning Situation Analysis System”. The

system identified that 32% of the students had the problem of “weak foundation in marketing” and 25% of the students had “unclear thinking in demand analysis”. On this basis, teachers formulated hierarchical teaching objectives for students with different learning situations, requiring the basic group to focus on strengthening the learning of principles and the advanced group to focus on the training of analysis skills.

4.2.2. In-class teaching implementation

The classroom adopted the “AI interaction + case teaching” model. Teachers pushed “demand analysis cases” with the help of the AI platform. After group discussion, students submitted demand analysis plans, and the AI analyzed the rationality of the plans and gave feedback in real time. In the practical part, students first simulated demand analysis (such as demand analysis of family customers) on the “AI Automobile Marketing Simulation Platform”, and the system prompted wrong operations (such as failing to understand the customer’s used car situation). After proficient operation, students carried out real car simulation drills, and teachers focused on guiding difficult problems.

4.2.3. After-class tutoring and evaluation

After class, the AI system pushed “personalized wrong question review” and “extended cases” for students in the experimental class and answered questions with the help of the “AI tutoring robot”. In terms of evaluation, the process evaluation of the experimental class (data of interaction and practice collected by AI) accounted for 60%, and the final assessment (real car simulation drill) accounted for 40%. The control class adopted the traditional evaluation method of “50% usual performance + 50% final assessment”.

4.3. Score Comparison

After one semester of teaching experiment, a comprehensive comparative analysis of the learning enthusiasm, mastery of knowledge and skills of the experimental class and the control class was carried out, especially the analysis of course assessment scores, to explore the impact of different teaching models on learning effects, as shown in Table 1-1 Score Comparison.

Table 1-1. Score Comparison

Indicator	Experimental Class	Control Class	Improvement Rate
Average score of course assessment	82.5	68.3	20.80%
Pass rate of skill certificate (Intermediate)	89%	66%	34.80%
Full score rate of practical operation	42%	18%	133.30%

4.4. Effect Analysis

It can be clearly seen from the score comparison table that in the teaching of the Automobile Marketing Technology course, the effect of the experimental class implementing the “AI-empowered teaching model” is significantly better than that of the control class without the AI-empowered teaching model. The average course assessment score, the pass rate of intermediate skill certificates and the full score rate of practical operation in the experimental class have all been greatly improved

5. Conclusion

At a time when higher vocational education is constantly seeking innovative breakthroughs, AI technology has opened up a new situation for its classroom teaching. Through this exploration of AI-empowered teaching practice, we have seen its

remarkable role in improving students' learning effects and strengthening skill training. However, this is only a starting point. In the future, it is necessary to continuously tap the potential of AI, combine the characteristics of higher vocational education, realize the deep integration of technology and teaching, and inject an endless driving force into the cultivation of higher vocational talents.

Disclosure statement

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