ISSN 2663-8169 Vol. 7, Issue 8: 57-63, DOI: 10.25236/IJNDE.2025.070809

Research on the Value-Added Path of Students' Professional Competence under the AI Driven "Teaching Learning Evaluation" Closed Loop——Taking Macroeconomics as an Example

Mengya Shen, Tingjun Huang*

College of Vocational Education, Xi'an Eurasia University, Xi'an, 710065, Shaanxi, China
**Corresponding author*

Abstract: *This study takes the course of Macroeconomics as a practical carrier, focusing on the deep integration of AI technology and the "teaching learning evaluation" system of higher education, and exploring the value-added logic and implementation path of students' professional competence. By conducting literature research to clarify core concepts and theoretical foundations, and combining empirical research methods to compare and analyze the differences in effectiveness between AI driven "teaching learning evaluation" closed-loop and traditional teaching models, a theoretical model of "AI empowering teaching learning evaluation → closed-loop dynamic linkage → professional competence enhancement" is constructed, and four major paths for professional competence enhancement are designed. The research results indicate that there has been a significant improvement in the four dimensions of professional cognition, professional practice, innovative thinking, and independent reflection. Research can provide a practical paradigm for the cultivation of professional competence in economic management courses, enriching the theoretical research on the integration of AI education and professional competence.*

Keywords: *AI Education, Teaching Learning Evaluation Closed Loop, Professional Ethics, Macroeconomics, Value Added Path*

1. Introduction

In the context of the development of educational informatization and intelligence, the "China Education Modernization 2035" proposes to promote the deep integration of artificial intelligence and education teaching, cultivate students' professional qualities, and provide policy guidance for higher education curriculum reform. From the perspective of industry practice, the requirements for practitioners' professional abilities in the fields of financial institutions, economic analysis, and policy research are becoming increasingly refined. For example, the macro research position in banks clearly requires the ability to interpret macroeconomic data, predict the impact of monetary policy, and analyze cross scenario problems [1]. However, the traditional teaching mode of macroeconomics is difficult to meet such practical needs.

The current "teaching learning evaluation" system in Macroeconomics has significant limitations: the "teaching" section focuses on theoretical content such as the mathematical proof of the IS-LM model and the derivation of economic growth model formulas, which is disconnected from the needs of professional scenarios such as GDP data interpretation and inflation type judgment; The learning process focuses on memorizing knowledge points, and students lack theoretical application training. For example, when facing the fluctuation of China's core CPI in 2023, most students are unable to accurately determine the type of inflation and propose corresponding policy recommendations; The evaluation process mainly focuses on final exams, which can only assess knowledge mastery and are difficult to cover professional competence dimensions such as practical ability and critical thinking ability. AI technology, with its advantages in data mining, personalized push, and dynamic evaluation, provides a feasible path for breaking the disconnect between "teaching learning evaluation" and achieving precise training of professional ethics.

On a theoretical level, this study not only fills the research gap in the integration of AI education and vocational literacy (existing research mostly focuses on knowledge transfer efficiency and neglects

ISSN 2663-8169 Vol. 7, Issue 8: 57-63, DOI: 10.25236/IJNDE.2025.070809

vocational literacy cultivation), but also improves the "closed-loop driven literacy value-added" model based on Bloom's educational goal taxonomy and feedback control theory, combined with the characteristics of AI technology, and clarifies the corresponding relationship between the "teaching learning evaluation" process and vocational literacy dimensions; At the practical level, it not only provides actionable solutions for the teaching reform of Macroeconomics (designing AI driven teaching tool application scenarios), but also forms a replicable path of "AI driven closed-loop - literacy value-added", which can be promoted to microeconomics, monetary and banking and other economic management courses, helping to improve teaching quality and cultivate students' employment competitiveness.

2. Core concepts and theoretical foundations

2.1 Definition of core concepts

2.1.1 AI driven "teaching learning evaluation" closed loop

The AI driven "teaching learning evaluation" closed-loop refers to a dynamic cycle system supported by artificial intelligence technology, which runs through the entire process of "setting teaching objectives, pushing teaching content, tracking the learning process, implementing multidimensional evaluation, and feedback on evaluation results"[2]. Compared with traditional closed-loop systems, its core features are reflected in three aspects: firstly, personalization, which adapts to different students' cognitive foundations and learning needs through the construction of learning profiles, such as pushing "Simplified Explanation of Economic Growth Models" for students with weak mathematical foundations and "Model Expansion Application Cases" for students with strong abilities; The second is dynamic, real-time tracking of teaching and learning process data, such as students' classroom interaction frequency, homework completion time, case analysis quality, etc., to adjust teaching content and learning paths in a timely manner; The third is precision, focusing on the goal of cultivating professional competence, designing multi-dimensional evaluation indicators, such as evaluating "professional practical competence" from three sub dimensions: "accuracy of data interpretation", "adaptability of policy tools", and "rationality of effect prediction", to ensure that the evaluation results are highly consistent with the competence goals.

2.1.2 Professional ethics

Based on the positioning of the course "Macroeconomics" and industry demand, this study defines the professional competence of students majoring in economics as four dimensions, and each dimension is closely related to the course: professional cognitive competence is the foundation, referring to students' understanding of the relationship between macroeconomic operating laws, core theories, and job positions, such as clarifying the relationship between "IS-LM model and central bank monetary policy formulation" and "Phillips curve and employment policy"; Professional practical literacy is the core, which refers to students' ability to apply macroeconomic theory to solve practical problems, reflected in data interpretation (such as using GDP, CPI, etc. to judge economic cycles), policy simulation (such as designing anti-inflation monetary policy combinations), and report writing (such as writing quarterly macroeconomic analysis reports); Innovation and critical thinking literacy is a high-level literacy that refers to students' ability to compare different macroeconomic schools of thought and critically evaluate policy effects, such as analyzing Keynesian and neoclassical views on "government intervention in the economy" and combining them with China's actual situation to propose viewpoints; Self-reflection literacy is a guarantee, which refers to students' awareness and ability to adjust strategies and continuously improve professional abilities based on learning feedback, such as actively supplementing knowledge of "fiscal policy constraints" based on literacy assessment reports, in order to achieve sustained appreciation of literacy[3].

2.2 Theoretical basis

2.2.1 "Teaching learning evaluation" closed loop theory

The "teaching learning evaluation" closed-loop theory is based on Bloom's taxonomy of educational objectives and feedback control theory. Bloom's taxonomy of educational goals divides cognitive domain goals into six levels: "memory understanding application analysis evaluation creation", providing a basis for setting goals in each link of "teaching learning evaluation"[4]. For example, in the "Inflation Theory" chapter of "Macroeconomics", the goal of "teaching" is set as "understanding inflation types

ISSN 2663-8169 Vol. 7, Issue 8: 57-63, DOI: 10.25236/IJNDE.2025.070809

(understanding level) - applying data to judge inflation types (application level) - evaluating inflation response policies (evaluation level)", and the "learning" and "evaluation" links need to be synchronized with corresponding goals. Feedback control theory emphasizes the precise achievement of system goals through a cycle of "measurement comparison correction". In an AI driven closed loop, "measurement" collects process data of teaching and learning through AI, "comparison" compares the difference between actual effects and literacy goals, and "correction" adjusts teaching content and learning paths based on the difference [5]. If it is found that students have "insufficient policy simulation ability", virtual simulation practice tasks are supplemented to form a continuous optimization closed loop.

2.2.2 Intelligent adaptive learning theory

The theory of intelligent adaptive learning advocates dynamically adjusting learning content, paths, and evaluation methods based on individual differences of learners. Its core logic is "data collection model construction strategy push"[6]. During the data collection phase, AI tools are used to collect data on students' pre-test scores, study duration, and answer accuracy; During the model construction phase, machine learning algorithms such as collaborative filtering and decision tree algorithms are used to construct learning profiles and identify students' strengths and weaknesses, such as' a student has strong data interpretation ability but weak policy effect prediction ability '; In the strategy push phase, personalized learning resources are pushed based on the learning profile, such as the "Policy Effect Prediction Case Library" and "Policy Simulation Special Training" for the above-mentioned students, to ensure that learning resources are highly matched with students' needs. This theory provides direct theoretical support for the "personalized teaching" and "personalized learning" links in the AI driven "teaching learning evaluation" loop, which can effectively solve the problem of "one size fits all" in traditional teaching and assist in the differentiated cultivation of professional ethics.

2.2.3 Formative evaluation theory

The theory of formative assessment was proposed by Scripps in 1967, emphasizing "process orientation" and "feedback optimization". Unlike traditional summative assessment, its core goal is to continuously track the learning process, identify problems in a timely manner, and provide feedback to promote the improvement of learners' abilities. In the AI driven "teaching learning evaluation" loop, the advantages of formative evaluation are fully utilized. Firstly, automation is achieved through AI tools to efficiently process the evaluation process. For example, the "Superstar Learning AI Evaluation Module" can automatically correct students' case analysis assignments and score them from three dimensions: "logical integrity", "data accuracy", and "policy suggestion rationality", significantly reducing the workload of teacher evaluation; Secondly, it is multidimensional, breaking through the limitations of traditional paper and pencil tests, and evaluating from multiple dimensions such as "knowledge mastery", "ability application", and "thinking quality". For example, through AI analysis of students' operational trajectories in virtual simulation systems, the "flexibility of policy tool selection" can be evaluated; The third is immediacy. The evaluation results are fed back to students and teachers in real time, and students can adjust their learning strategies in a timely manner. Teachers can optimize teaching content accordingly. For example, after students complete the "inflation type judgment" test, AI immediately provides feedback on "not considering the impact of PPI data on inflation types" and pushes relevant supplementary information to ensure the timeliness and effectiveness of feedback.

3. AI driven closed-loop architecture and value-added path for professional ethics

3.1 AI driven closed-loop architecture of "teaching learning evaluation" in Macroeconomics

Based on core concepts and theoretical foundations, this study constructs an AI driven "teaching learning evaluation" closed-loop architecture for Macroeconomics, which includes three core links: "AI driven teaching", "AI empowered learning", and "AI supported evaluation", as well as an "intelligent feedback mechanism"[7]. The AI technology support, core functions, and professional ethics of each link are related.

Taking the chapter on "Economic Growth Models" in "Macroeconomics" as an example, the closed-loop operation process is as follows: Firstly, AI uses web crawling technology to capture recruitment information for "macro research positions" in securities firms, extract professional abilities such as "Economic Growth Dynamics Analysis" and "Growth Model Application", and convert them into teaching objectives; Secondly, based on students' pre-test scores (such as the "Solow Model Basic Test"), AI pushes "Solow Model Animation Explanation" to students with weak foundations and "Endogenous Growth Model Expansion Cases" to students with strong abilities; In the classroom, students simulate

ISSN 2663-8169 Vol. 7, Issue 8: 57-63, DOI: 10.25236/IJNDE.2025.070809

the impact of a country's R&D investment on economic growth in a virtual simulation system, and AI displays in real-time the effect of "a 1% increase in R&D investment leads to a 0.3% increase in GDP growth rate"; After class, AI automatically corrects students' "Economic Growth Dynamics Analysis Report", scores them based on "Data Citation Accuracy," "Model Application Rationality," and "Policy Suggestion Feasibility," and generates a literacy report; Finally, AI provides feedback to teachers that 'students have insufficient mastery of' technology progress measurement methods' 'and pushes' technology progress measurement micro courses' to students, completing a closed-loop cycle.

3.2 Four major paths for enhancing professional ethics

Based on the above closed-loop architecture and combined with the core chapters of macroeconomics, teachers have designed four main paths to enhance professional abilities - each path clearly defines "artificial intelligence action points, closed-loop linkage methods, ability enhancement logic, and curriculum application scenarios" to ensure the operability and pertinence of the path.

3.2.1 Path 1: AI driven "teaching career needs" precise matching, value-added "professional cognitive literacy"

In the value-added of professional cognitive literacy, AI focuses on the "teaching" and "evaluation" links: by mining job demand data, matching teaching objectives, clarifying the relationship between macroeconomics theory and professional positions, and using classroom tests and feedback to strengthen students' understanding of the meaning of learning. Its closed-loop linkage is as follows: AI captures job recruitment information in the fields of finance and policy, extracts core professional abilities through natural language processing, and establishes a "professional ability teaching objectives" mapping table; Teachers adjust their teaching content accordingly and add professional scenario cases; Students use AI platforms to clarify the correlation between career needs and teaching objectives; AI evaluates professional cognitive level through classroom tests and provides feedback to teachers to optimize teaching, forming a complete linkage cycle [8].

In traditional teaching, students are prone to lack of learning motivation due to the disconnect between learning and application. AI connects "career needs teaching objectives learning content" to clarify the corresponding professional abilities and application scenarios of theory, achieving a transition from passive learning to active exploration, thereby enhancing professional identity and depth of professional cognition, and promoting the value-added of professional cognitive literacy. Taking the chapter on "Inflation Theory" as an example, AI transforms the requirement for "inflation analysis ability" in banking positions into teaching objectives. Teachers teach based on the 2023 Chinese inflation data, while students refer to bank report templates for learning. After class, AI pushes tests and provides supplementary resources for weaker students.

3.2.2 Path 2: AI empowers "immersive practical learning" and adds value to "professional practical literacy"

In the value-added of professional practical literacy, AI focuses on the "learning" and "evaluation" links: using virtual simulation technology to construct practical scenarios, allowing students to "learn by doing", while providing real-time feedback on practical effects through process evaluation tools to enhance practical abilities. Its closed-loop linkage is as follows: AI constructs a virtual scene containing "problem scenario optional solution effect feedback" based on the core chapters of "Macroeconomics", and then pushes personalized tasks according to students' learning profiles; After students complete the practice, AI displays the effect in real time and evaluates it from multiple dimensions. Finally, the results are fed back to teachers and students for adjusting practice strategies and supplementing teaching content, forming a complete cycle.

Traditional teaching of macroeconomics is difficult to truly intervene in the economy, and practice is mostly based on case analysis, resulting in students lacking firsthand experience. AI virtual simulation builds high fidelity professional scenarios, allowing students to play roles such as policy makers, understand theoretical application boundaries and practical constraints in practical operations, transform abstract theories into operational abilities, and achieve value-added professional practical literacy. Taking the "Monetary Policy" chapter as an example, AI constructs a high inflation economic scenario. After students choose policy tools, AI displays the effects in real time and scores them. Students adjust their strategies based on feedback, and their practical literacy improves through iteration.

3.2.3 Path 3: AI supports "critical thinking training" and enhances "innovative thinking literacy"

In the value-added of innovative thinking literacy, AI focuses on the "learning" and "evaluation"

ISSN 2663-8169 Vol. 7, Issue 8: 57-63, DOI: 10.25236/IJNDE.2025.070809

stages: breaking the single theoretical indoctrination by presenting diverse perspectives, guiding students to actively analyze and question through critical thinking reports and evaluations, and cultivating critical thinking. Its closed-loop linkage is: AI collects viewpoints and empirical cases from different schools of thought on controversial issues in macroeconomics; After assigning speculative tasks, teachers analyze the reports submitted by students and organize forum discussions. Finally, the system generates evaluation report feedback based on the teacher's rating, forming a cycle of "viewpoint presentation": task allocation→report writing→discussion and evaluation→reflection and improvement.Traditional teaching often focuses on a single school of thought, which can easily lead students to develop passive receptive thinking. AI provides diverse perspectives and empirical data, combined with critical thinking tasks and evaluations, guiding students to actively compare, analyze, and question the differences between theory and reality, cultivate independent thinking ability, and achieve value-added innovative thinking literacy. Taking the chapter on "Economic Growth Models" as an example, AI collects viewpoints and cases from Solow models and endogenous growth models around technological progress, pushes critical thinking tasks, scores student reports from logical and innovative dimensions, and pushes supplementary literature. Students modify their reports based on feedback, and their innovative thinking ability is improved.

3.2.4 Path 4: AI dynamic "evaluation feedback improvement", value-added "self-reflection literacy"

In the process of enhancing self-reflection literacy, AI runs through the entire "teaching learning evaluation" process: by dynamically tracking learning data to generate multidimensional literacy reports, personalized resource recommendations are used to guide students to adjust their learning strategies and cultivate reflective abilities. Its closed-loop linkage is: AI tracks classroom participation, homework, practice, critical thinking and other data in real-time, and generates weekly reports containing literacy scores, weak links, and improvement suggestions; Push micro lessons, practice questions and other resources based on weak points, students independently develop learning plans, and AI evaluates improvement effects through weekend quizzes and optimizes next week's reports, forming a complete cycle.

In traditional teaching, students find it difficult to identify their own shortcomings in literacy, and teachers' feedback lacks specificity. AI enables students to clearly identify their weaknesses and directions for improvement, and to master reflection methods through a cycle of "assessment learning reassessment", thereby enhancing their ability to reflect independently. Taking the entire course of Macroeconomics as an example, the students' first week report showed that their practical and reflective literacy needed to be improved. AI pushed corresponding resources and suggestions, and after learning from this, the students' scores in the following week significantly improved. Through continuous feedback and improvement, they developed a habit of self-reflection.

4. Core challenges and countermeasures

Although the AI driven "teaching learning evaluation" loop has achieved good results in practice, it still faces challenges in the application process at the four levels of technology, teaching, students, and evaluation. Targeted solutions need to be proposed to ensure the sustainable operation of the loop.

4.1 Technical aspect: Data security and tool adaptability

The AI driven "teaching learning evaluation" loop in Macroeconomics faces two major technical issues: first, data security risks. AI tools need to collect data such as student test scores and practice trajectories. Some platforms have privacy breaches due to non-standard storage and unclear permissions, such as a situation where homework data has been obtained by a third party on a certain platform; The second issue is insufficient tool adaptability, with low compatibility between general AI tools and courses. For example, virtual simulation systems are difficult to simulate the effects of policy combinations, evaluation tools cannot accurately assess innovative thinking literacy, and some tools are complex to operate (requiring programming skills), beyond students' ability range[9].

Therefore, in terms of data security management, compliance platforms (such as the smart education platform recommended by the Ministry of Education) should be selected, security agreements should be signed to clarify the scope of data collection, storage period, and permissions, AES-256 encryption technology should be used, and student data security education should be carried out at the same time; In terms of tool adaptability improvement, the joint development team customizes course functions (such as policy combination simulation in the "Monetary Policy" chapter), simplifies the operation process and

ISSN 2663-8169 Vol. 7, Issue 8: 57-63, DOI: 10.25236/IJNDE.2025.070809

provides guidance, and establishes a "trial feedback optimization" mechanism to iterate tool functions.

4.2 Teaching level: Insufficient AI application ability of teachers

The core issue at the teaching level is the insufficient AI application ability of teachers. Firstly, the technology application is weak, and some teachers do not know how to operate the virtual simulation system backend, interpret learning reports, and have cognitive biases towards AI principles, such as believing that AI can replace teachers or evaluating results without intervention; Secondly, there is insufficient teaching design, with most teachers only using AI as an auxiliary tool and not forming a systematic design of "AI+literacy cultivation", which leads to a tendency towards technology abuse; Thirdly, there is a disconnect in training support, with school training mostly focused on theoretical explanations and lacking practical training in macroeconomics courses.

To address the above issues, training can be carried out in layers, providing practical training on AI tools for teachers with weak foundations, conducting "AI+instructional design" training for teachers with better abilities, and establishing a "1+1" assistance mechanism;The school establishes a macroeconomics artificial intelligence teaching resource library, encourages teachers to upload cases (and provides corresponding incentive measures), and regularly organizes case seminars; At the same time, the school has established a teaching support team to provide real-time assistance to teachers and offer optimization suggestions in the classroom.

4.3 Student level: AI dependence and weakening of autonomous thinking

At the student level, there is mainly a problem of AI dependence and weakened autonomous thinking. One is excessive reliance on AI, with some students using it as a source of answers, plagiarizing case thinking, relying on AI to answer questions, and weakening their ability to analyze independently; Secondly, there is a lack of initiative in learning, with personalized resources pushed by AI only completing necessary tasks and lacking motivation for self-directed learning; Thirdly, there are differences in digital literacy, and a small number of students in remote areas do not know how to use Excel to process data or operate virtual simulation systems, which affects their participation in AI closed-loop teaching[10].

In terms of countermeasures, attention should be paid to guiding the correct use of AI, clarifying its "learning assistant" positioning, designing AI assisted exploration tasks, and optimizing tools for thinking guidance mode; Teachers promote tasks and stimulate students' initiative in learning by introducing a literacy scoring system (linked to daily grades), showcasing cases of improved literacy rates, and designing career scenarios; Teachers identify students with weaknesses through pre class assessments, provide professional training, and offer one-on-one volunteer guidance to ensure their full participation in the classroom, thereby improving students' digital literacy.

4.4 Evaluation level: Quantifying the dimension of literacy is difficult

The core issue at the evaluation level is the difficulty in quantifying the dimensions of literacy. One is the difficulty in quantifying soft skills, such as "innovative thinking" and "self-reflection", which are abstract and subjective. AI can only evaluate through indirect indicators such as report word count, and can't accurately measure the true level of "viewpoint innovation"; Secondly, the weight of indicators is unreasonable, and AI evaluation tools mostly use default weights, which are difficult to adapt to the cultivation focus of different schools and majors, such as application-oriented and research-oriented colleges with different emphasis directions; Thirdly, there is a lack of integration in the results. The fragmented scores generated by AI for classroom interaction, homework, etc. are not related to the dimensions of literacy, making it difficult for teachers and students to understand the impact of each link on literacy.

AI quantification+teacher qualitative evaluation can be used, with quantifiable indicators AI scoring, difficult to quantify indicators teacher rating and writing comments, and comprehensive results based on weights; The system allows custom indicator weights, development and adjustment functions, provides reference templates, and then collects feedback for optimization; Teachers construct reports related to "literacy links", analyze the contribution of literacy in each link, visualize the results, and add targeted improvement suggestions.

ISSN 2663-8169 Vol. 7, Issue 8: 57-63, DOI: 10.25236/IJNDE.2025.070809

5. Conclusion

This study takes "Macroeconomics" as a practical carrier and focuses on the value-added path of students' professional competence under the AI driven "teaching learning evaluation" loop. Through literature research, case analysis, empirical research and other methods, three conclusions are drawn: at the theoretical level, an AI driven "teaching evaluation" closed-loop architecture is constructed, which includes three major links of "AI driven teaching", "AI empowered learning" and "AI supported evaluation", and an "intelligent feedback mechanism". The logic of "AI empowered teaching learning evaluation → closed-loop dynamic linkage → professional competence value-added" is clarified, and each link is personalized, dynamic and precise through AI. It is highly integrated with the professional cognition, professional practice, innovative thinking, and independent reflection of students majoring in economics. Aligning and enriching the theoretical research on the integration of AI education and professional competence; At the practical level, the effectiveness of the four major value-added paths for professional ethics has been designed and verified. Path one solves the problem of professional cognitive ambiguity by matching "teaching professional needs" with AI. Path two uses AI to build immersive practice scenarios to strengthen professional practical abilities. Path three uses AI to support critical thinking training to enhance innovative thinking literacy. Path four relies on AI dynamic "evaluation feedback improvement" to cultivate self-reflection ability. At the application level, the challenges and countermeasures of AI driven closed-loop applications have been summarized. At the technical level, data security and tool adaptation need to be strengthened. At the teaching level, teachers need to enhance their AI application and teaching design abilities. At the student level, they need to guide the correct use of AI and stimulate initiative. At the evaluation level, "AI+teachers" evaluation and optimization reports need to be used to evaluate and optimize AI Provide assurance for the continued application of macroeconomics and similar courses.

Acknowledgements

This work was supported by the Education Science Plan for Shaanxi Province's 14th Five Year Plan in 2024(No. SGH24Y2600) ; Ministry of Education Supply-Demand Matching Employment Education Project(No. 2025061961772).

References

[1] Huang R H, Yang J F, Hu Y B. The Triple Realm of Smart Education: From Environmental Intelligence to Ecological Intelligence[J]. Modern Educational Technology, 2020, 30 (1): 5-12.
[2] Baker R S, Inventado P S. Educational Data Mining and Learning Analytics: An Updated Survey [J]. IEEE Transactions on Learning Technologies, 2014, 7 (1): 13-24.
[3] Li Z T. On the Essence, Path, and Implementation Conditions of "Teaching Learning Evaluation" Integration [J]. Education Measurement and Evaluation, 2022 (1): 5-11.
[4] Zhang C G, Li X. The cultivation path of vocational literacy for college students in the era of artificial intelligence [J]. Higher Education Research, 2021, 42 (5): 77-83.
[5] Liu S N Y, Huang B, Zheng L X, et al. The connotation, core elements, and application scenarios of AI empowered education [J]. China Electronic Education, 2020 (06): 1-7.
[6] Chen L, Lin S Y, Zheng Q H. Internet plus Education: A New Starting Point of China's Educational Informatization [J]. Research on Audio Visual Education, 2016, 37 (01): 5-10.
[7] Zhou Y L, Zhang B H, Yang J F. The practical evolution and theoretical exploration of intelligent education: based on the perspective of "technology education society" synergy[J]. Education Research, 2022, 43 (09): 115-126.
[8] Wang C X, Zhang J P. Ethical considerations and normative pathways for the application of artificial intelligence in education [J]. Education Research, 2021, 42 (07): 106-115.
[9] Yu S Q, Wang A X. Educational Reform in the Era of Artificial Intelligence [J]. Basic Education Reference, 2018 (04): 3-8.
[10] Gu X Q, Yi L Y, Zhu Z T. The Trend of Digital Education Resource Construction and Application [J]. China Electronic Education, 2013 (09): 1-7.