Research on the Application of Artificial Intelligence in the Instructional Design of Retail Courses

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Abstract: *In the era of global digital transformation in education, artificial intelligence (AI) is increasingly embedded in the design, delivery, management, and evaluation of various professional courses, driving profound shifts in traditional educational paradigms. This study systematically reviews the applications of AI technology in the curriculum development and teaching practices of Retail Studies, covering key dimensions such as course design optimization, instructional delivery platforms, personalized learning pathways, and learner profiling systems. By synthesizing representative case studies and advanced technological platforms, the research offers a multifaceted analysis of the core benefits and potential challenges of AI-enhanced retail education. It explores how AI redefines pedagogical approaches and boosts instructional effectiveness, supported by empirical evidence of its real-world impacts. AI not only streamlines knowledge dissemination but also enables high-fidelity retail simulations, fostering the integrated development of students' strategic thinking and practical skills.*

Keywords: *Artificial Intelligence; Retail studies; Teaching applications; Digital and intelligent transformation*

1. AI-Assisted Instructional Design in Retail Courses

Artificial intelligence (AI) technology can markedly enhance the efficiency and quality of instructional design in retail studies curricula. First, knowledge graph construction serves as a pivotal tool[1]. By structurally mapping interconnections among course knowledge points, knowledge graphs help educators clarify logical relationships between modules, enabling the creation of more rigorous teaching plans[2]. For example, a university training report noted: "Knowledge graph implementation allowed instructors to better understand the logical relationships in course content, leading to more scientifically sound teaching plans." In retail studies, developing knowledge graphs that incorporate core concepts like product classification, channel management, and customer relationship management supports curriculum restructuring and resource integration.

Second, AI-assisted generation of lesson plans and courseware significantly boosts preparation efficiency. Certain AI tools can automatically produce detailed, structured lesson plans and supporting materials based on predefined course objectives and content. Research shows that AI educational assistants generate lesson plans with teaching sequences and diverse resources tailored to instructor-specified goals, optimizing the preparation workflow. For instance, using large language models (LLMs) such as Doubao, KIMI, and Baidu Wenxin, instructors can input retail case studies or topic outlines, and the system will output corresponding instructional designs and courseware frameworks[4], drastically cutting manual effort.

Third, AI supports case generation and content optimization by automatically creating retail cases aligned with teaching needs through data analysis. AI systems apply natural language processing and knowledge extraction to retail industry data and existing cases, identifying key concepts, relationships, and core data while structuring the information. For example, the "Retail Business Case Dynamic Graphical Generation System" developed by researchers uses LLMs to perform entity extraction and relationship analysis on input cases, producing structured knowledge graphs with technical terms and data trends. Educators can thus quickly obtain visual aids, transforming abstract business logic into student-friendly dynamic diagrams and refining course content and resources. Additionally, AI analyzes student feedback data to iteratively update syllabi, enabling intelligent content evolution. In dynamic recommendation systems, AI delivers personalized teaching materials based on student profiles and performance data, increasing design flexibility and efficiency.

2. Generational Evolution of Retail Simulation Technology and Its Educational Adaptation

Educational technology advances through generational leaps rather than linear progression. This pattern is especially evident in retail education, manifesting in two key trends: the refinement of hyper-realistic simulation environments and the cognitization of auxiliary teaching systems. The evolution of retail simulation technology reflects ongoing improvements in computational power and algorithms, achieving closer approximations of real-world retail scenarios[3]. This progression is outlined in the table below, highlighting transitions from basic to advanced intelligent simulations alongside enhanced pedagogical features.

Table 1: Evolution History of Retail Simulation Technology

Dimension	First Generation: Spreadsheet Simulation	Second Generation: Dynamic Game Software	Third Generation: AI-Driven Digital Twins
Core Algorithm	Linear regression equations	Probability distributions and game theory matrices	Multi-agent modeling (ABM) + LLM-driven behavior trees
Interaction Interface	2D data tables and static charts	2D control panels and simple animations	3D immersive spaces, VR/AR, holographic projections
Market Feedback	Immediate and deterministic outcomes	Periodic with random perturbations	Real-time evolution with long-tail and butterfly effects
Competitive Environment	Single-player vs. system	Closed games in local networks	Open ecosystems accessing real macro data streams
Assessment Priorities	Calculation accuracy and profit maximization	Strategic games and risk control	Systems thinking, crisis response, and innovative decision-making logic

Concurrently, auxiliary systems in retail education have shifted from "retrieval-oriented" to "generative" models. This change stems from AI's evolution beyond simple knowledge indexing, becoming a cognitive partner with deep contextual awareness and coherent reasoning.

Early retail teaching aids used static decision trees for interactions, providing rigid, pre-set corrective feedback detached from specific contexts. For instance, errors in cost calculations or pricing strategies might elicit uniform prompts like "Focus on cost control," without addressing root causes.

Advancements in AI, especially LLMs, have transformed this landscape. In retail pedagogy, AI assistants now perform three essential roles to create an interactive[4], guided ecosystem:

(1) Socratic mentors, using progressive questions to guide independent problem exploration;

(2) personalized cognitive coaches, offering tailored explanations based on learning paces and gaps;

(3) emotionally responsive training partners, detecting affective states for feedback while simulating market competitions.

3. Typical Application Cases in Retail Teaching and AI Technology Platforms

As AI permeates the retail sector, more universities and platforms are adopting it to innovate retail studies curricula. Below are representative cases and available AI platforms illustrating AI's role in retail education.

3.1 Representative Application Cases in Retail Education

(1) Yunna Technology's "AI New Retail Training Platform" Yunna Technology's platform is a fully digital retail training initiative for universities, integrating unmanned stores, smart shelves, and intelligent payment systems. It helps students master advanced retail technologies and data skills by simulating store operations, bridging theory and practice. Students operate hardware and analyze big data to refine management, gaining practical expertise.

(2) Boda Qiancheng's "Botrix Smart Retail Virtual Simulation Platform" This platform uses a 2.5D

simulation map to replicate smart retail environments, supporting individual or group training. Designed for marketing and e-commerce courses, it improves teaching efficiency and practical skills. Through gamified simulations, students learn supermarket operations like site selection, design, procurement, and inventory, experiencing real decision-making and building experience.

(3) Georgetown University–National Retail Federation Collaborative Program Georgetown's McDonough School of Business and the NRF invested $6 million to innovate retail education, embedding AI in areas like customer experience, supply chain, and inventory forecasting. Students gain advanced tools and hands-on projects, enhancing theoretical knowledge and competitiveness. The program includes a research chair, summits, and scholarships, fostering industry-academia-research integration.

(4) SKEMA Business School–LVMH Luxury Retail Program SKEMA's "Retail Excellence and Customer Relationship Management" master's program integrates AI into customer experience modules, blending theory with field work at LVMH stores. Students learn AI-driven engagement and practice strategies in luxury settings, developing AI-retail hybrid talents.

(5) Beijing University of Posts and Telecommunications' Future Classroom Initiative This initiative features an "AI Application Supermarket" with tools like Youpu, Mashang, and Zhilian for multimodal learning. Traditional instructors collaborate with "digital experts," while virtual agents simulate roles like clients or engineers, enabling full workflow simulations from analysis to release, boosting interactivity and practical quality.

3.2 Alternative technical platforms

To foster innovation in retail studies, consider these AI platforms, each offering unique strengths in design, delivery, and analytics.

(1) Large-Scale Pre-trained Language Models Models like ByteDance's Doubao, iFlyTek's Spark, and Baidu's ERNIE Bot aid in lesson plans, content creation, and simulations. For example, Baidu's system supports dialogues and exam prep, improving language skills.

(2) Virtual Simulation Training Platforms Platforms like Botrix recreate scenarios with big data analytics for decision experiments. Yunna's smart systems provide immersive experiences, enhancing operations.

(3) Smart Classroom and Interactive Systems Kahoot! and UMU use gamified assessments for engagement and personalized recommendations. AI generates questions and evaluates, while systems like Zhihuishu create tailored paths and real-time assessments.

(4) AI Visualization and Content Generation Tools InsCode converts cases into diagrams and presentations, aiding efficient material creation and enhancing student understanding.

(5) Student Profiling and Data Analytics Platforms These analyze behaviors and performance to build profiles and deliver resources. Machine learning identifies gaps for interventions, using cycles like data collection →profiling → delivery → feedback.

3.3 Comprehensive Applications and Future Prospects

These cases and platforms highlight AI's growing role in retail education, enhancing interactivity, practicality, and personalization. Future innovations may include VR/AR immersive systems or blockchain supply chain simulations. Challenges like equipment costs, student adaptation, and biases persist, requiring balance between innovation and quality for sustained progress.

4. Application Map of AI in Core Teaching Modules of Retail Studies

AI has deeply integrated into five core retail domains: consumer behavior, supply chain, omnichannel marketing[5], store management, and strategic finance. Following a "pain point resolution → scenario implementation → technical support → capability transformation" logic, it forms a practice-oriented framework, detailed below:

Table 2: Application Map of AI in Five Core Areas of Retail Education

Core Area	Traditional Teaching Pain Points	Core AI Application Scenarios	Key Technology Support	Student Competencies/Teaching Value
Consumer Behavior and Deep Market Insight	1. Focus on macro demographics, lacking micro psychological training. 2. Limited unstructured data processing (e.g., sentiments). 3. Difficulty grasping irrational motivations.	1. Synthetic Holographic Profiles: Generative AI creates virtual consumers (e.g., "minimalist single mother"); students interview using projective/laddering techniques. 2. Emotional Computing: Simulate social media; use NLP for sentiment/topic analysis to detect weak signals.	Generative AI, NLP (sentiment polarity, topic modeling)	1. Master subconscious need excavation. 2. Develop weak signal detection. 3. Understand butterfly effects in reputation management.
Intelligent Supply Chain and Agile Operations	1. Abstract content hinders concrete understanding. 2. Nonlinear fluctuations (e.g., bullwhip effect) unclear.	1. Bullwhip Visualization: Simulate four-tier chains with AI nodes; introduce disturbances for 3D demos. 2. Predictive Games: Train AutoML models; simulate algorithmic collusion for ethical discussions.	Digital twins, AutoML (ARIMA/ Prophet/LSTM)	1. Grasp fluctuation mechanisms. 2. Learn algorithm applications. 3. Build ethical cognition.
Omnichannel Marketing and AIGC Content Factory	1. 4P theory emphasis, lacking production training. 2. No real-time feedback leads to theorizing.	1. AIGC Workshop: Full workflow from sketches to copy; master prompt engineering and A/B testing. 2. Pricing Experiments: Adjust weights; simulate price discrimination for ethics debates.	AIGC (Midjourney/Stable Diffusion/ KIMI), recommendation algorithms, A/B testing	1. Master AIGC production. 2. Develop data-driven intuition. 3. Establish ethical judgments.
Smart Store Management and Visual Marketing	1. Venue/cost limits on experiments. 2. Inability to adjust/verify displays frequently.	1. VR Displays: Adjust in virtual stores; generate heat maps and CV evaluations. 2. Crisis Sandbox: Random events; AI NPCs for emotional timelines and interventions.	VR, simulated eye-tracking, CV, NPC simulation	1. Balance aesthetics and efficiency. 2. Enhance crisis response. 3. Master timing in management.
Strategic Finance and Business Acumen	1. Disconnect between analysis and operations. 2. Overlooking long-term decision impacts.	Simulation Games: Group competitions; AI consultations with DuPont models; visualize cross-period effects.	DuPont analysis, competitive simulations	1. Link decisions to metrics. 2. Cultivate long-termism. 3. Improve risk prediction.

5. Pedagogical Reforms and Potential Challenges in AI-Enabled Retail Courses

AI has sparked transformative reforms in retail education, yielding multiple benefits. It boosts efficiency and quality through personalized models that adapt to individual paces, overcoming homogenized teaching limitations. Empirical studies show improved performance and engagement, with AI recommendations enhancing initiative. AI also promotes equity by providing equal access to resources across backgrounds.

However, challenges include data security/privacy risks, requiring encryption and regulations; educator role shifts, necessitating AI/data training; and ethical/employment issues like fairness, copyrights, and market changes. Institutions should integrate ethics and governance into curricula to foster technically proficient, responsible graduates.

6. Conclusion

AI is reshaping retail course design and practice. Through knowledge graphs, automated plans, and simulations, it enhances content rigor and efficiency. In delivery, intelligent assistants, interactive systems, and platforms diversify approaches and optimize experiences. Learner profiles enable targeted support. Cases from labs and collaborations cultivate AI-literate professionals, though challenges like privacy and ethics remain. Future retail education should innovate with multimodal systems, equipping students with technologies, critical thinking, and responsibility for the intelligent retail era.

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