

# Optimization and Improvement Strategies of Blended Teaching in Management Information System Courses Empowered by AI

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**Abstract:** The comprehensive integration of artificial intelligence technology is facilitating a paradigm shift in higher education from “digital assistance” to “intelligent reconstruction”. Management information system courses represent a critical intersection of management science and information technology. However, the traditional hybrid teaching model encounters structural challenges, including outdated content, superficial practical applications, limited evaluation metrics, and a lack of ethical education. This research draws upon disciplinary insights, integrating social cultural theory and distributed cognition theory to develop a theoretical framework centered on “cognitive spiral development”, with AI embedded within the four-dimensional integration of “teaching, learning, evaluation, and research”. Based on this framework, four primary optimization strategies are proposed: dynamic content generation and knowledge graph construction render course content dynamic; human-machine collaborative exploratory learning design deepens the practical process; multi-dimensional data-driven precise evaluation enhances learning feedback accuracy; and the integration of technology and ethics establishes a clear educational orientation. This research aims to offer a systematic solution that combines theoretical depth with practical applicability for the intelligent transformation of management information system courses empowered by AI, thereby providing an operational reference paradigm for cultivating interdisciplinary talent in the context of emerging business and engineering fields.

**Keywords:** Artificial Intelligence, Blended Teaching, Management Information System.

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## 1. Introduction

The New Generation Artificial Intelligence Development Plan issued by the State Council clearly points out that the teaching paradigm should be revolutionized through the empowerment of intelligent technology, and a new education ecosystem of “intelligent learning + interactive learning” should be constructed. In this context, higher education, which shoulders the mission of cultivating high-level talents for the country, is in the double change of digital transformation and connotative development, and its deep integration with artificial intelligence has become an important trend of global development [1]. This change is especially urgent for management information system courses. As a pivotal course naturally rooted in the intersection of information technology and management practice, MIS requires students to master the technical principles of database, network, and software development, as well as management thinking such as business process optimization, organizational change management, and data-driven decision-making. However, in traditional blended teaching, the static stacking of online resources and the limited interaction in offline classrooms often make it difficult to bridge the gap between theory and practice, not to mention responding to the industry's urgent call for “technically savvy, managerially savvy, and innovative” composite talents. In order to transform this trend into a profound educational change, it is necessary to respond to a series of key questions: How can the technology represented by intelligent environment twins really break through the time and space limitations of traditional university teaching and fundamentally reshape the learning field? When the complex challenges of the real world increasingly emphasize the

importance of interdisciplinary collaboration, how can AI tools substantially eliminate disciplinary barriers and effectively enhance learners' interdisciplinary innovation ability.

The fundamental value proposition of the intelligent transformation of higher education is evident at two levels. First, artificial intelligence, through its robust capabilities in environment construction and resource generation, transcends traditional limitations of time and space in teaching and learning, thereby creating new avenues for large-scale personalized education. Second, it addresses the pressing demand for interdisciplinary innovative talent in the intelligence era by facilitating the integration and restructuring of cross-domain knowledge [2].

For an extended period, the information technology exemplified by computers and the Internet has facilitated, to some extent, the fragmentation of higher education in terms of time utilization and the virtualization of spatial forms. However, significant limitations remain evident. Students who engage in learning during fragmented time often lack systematic guidance, which leads to superficial understanding and hampers the development of a coherent and logically structured knowledge system. Furthermore, online teaching environments are frequently perceived merely as a digital extension of traditional classrooms, failing to establish a logical and hierarchical depth of knowledge structure. In this context, cyberspace learning merely replicates classroom experiences, resulting in low immersion and weak interactivity, with a relatively loose teaching structure [3]. The advent of artificial intelligence offers a promising avenue to address these challenges.

The fundamental value of this AI-driven paradigm shift in education resides in its capacity to address individualized

needs by transforming the spatial and temporal dimensions of teaching and learning. Furthermore, it responds to the complexities of real-world problems by integrating multidisciplinary knowledge systems [4-5]. In the Introduction to Artificial Intelligence course, the researcher has successfully implemented a model of “classroom teaching + platform practical training”, which facilitates dynamic content updates and multi-dimensional evaluations [6]. This approach effectively fosters the development of students' cognitive abilities through a “cognitive spiral development” framework. In the realm of foreign language education, the teaching model known as “human-computer-interpersonal synergy” has redefined the role of AI from a mere tool to an active participant capable of social interaction and cognitive regulation. This model offers a theoretical framework to address issues related to cognitive reliance and emotional disconnection [7]. In the fields of biochemistry and molecular biology, the generative AI platform, encompassing the four dimensions of “teaching, learning, assessment, and research”, illustrates the potential for comprehensive empowerment. This empowerment ranges from assisted lesson preparation to serving as an intelligent learning companion, as well as from homework correction to facilitating data research [8]. In the context of jurisprudence practice, the researcher has developed a three-dimensionally coupled dynamics model that systematically addresses the integration challenges of technology adaptability, subject synergy, and demand orientation [9]. These interdisciplinary explorations at the forefront of research offer substantial theoretical insights and practical references for the intelligent reform of management information system courses.

However, it is important to acknowledge that the broad AI empowerment framework cannot be readily applied to specific disciplinary contexts. Current research on incorporating generative AI into education reveals a top-heavy emphasis on system development over disciplinary application, with limited exploration of discipline-specific approaches [10]. This study seeks to analyze the unique challenges encountered in blended teaching within the management information system course, aiming to develop a comprehensive strategy for effectively integrating AI. The goal is to offer a practical and theoretically sound pathway for intelligently transforming the course.

## 2. Realistic Dilemmas in MIS Blended Teaching

The management information system course is a core requirement for numerous majors, including information management, information systems, e-commerce, and business administration. The reform of its blended teaching model has been underway for several years. However, the wave of intelligence has revealed some entrenched structural contradictions.

First, the “time lag” dilemma arises from the disparity between the slow update of teaching content and the rapid advancement of cutting-edge technology. The knowledge framework of the management information system course exhibits a notable “technological companionship”. The evolution of technology, encompassing enterprise resource planning, cloud computing, big data analysis, and artificial intelligence applications, is relentless. In contrast, traditional teaching materials and courseware are typically revised on an annual basis, resulting in a knowledge gap that is challenging

to bridge between static educational content and dynamic industrial practices [1, 2]. Consequently, students may learn system development methodologies that are a decade old in the classroom, while their internships expose them to intelligent decision-making platforms utilizing large language models. This temporal disjunction not only diminishes the practical relevance of the course but also undermines students' sense of connection to the usefulness of their knowledge.

Second, the deep contradiction arises from the disparity between the superficial nature of practical exercises and the development of intricate system capabilities. The primary objective of the management information systems course is to enhance students' holistic skills in analyzing, designing, and executing information systems. Nevertheless, due to constraints in teaching resources and technological infrastructure, conventional practical sessions often devolve into mere “software drills” or “predefined case studies”, depriving students of the chance to grapple with genuine, intricate, and dynamic problems. Even with the integration of online experimental platforms in blended learning approaches, these tools typically operate at a rudimentary “fill-in-the-blank” level, making it challenging to prompt students to delve deeply into the interplay between business logic and system architecture. Consequently, fostering their capacity for innovative problem-solving amidst uncertainty and amalgamating knowledge from diverse disciplines becomes an arduous task.

Third, there exists a misalignment between the dimensions of the single evaluation method and the requirements for personalized growth. The current evaluation system for blended teaching primarily relies on final closed-book examinations and experimental reports. Furthermore, the assessment of online learning behaviors is largely confined to shallow indicators, such as video viewing time and the number of homework submissions. These metrics fail to capture the depth of students' cognitive engagement, the quality of their collaborative communication, and their problem-solving abilities. This “one-size-fits-all” evaluation approach is inadequate for accurately identifying students' personalized learning needs and does not effectively stimulate their intrinsic motivation to learn, which deviates from the educational ideal of tailoring instruction to individual aptitudes.

Fourth, there exists a notable absence of a forward-looking perspective regarding the relationship between the deficiency of ethical education and the risks associated with technology application. As information systems permeate every aspect of social life, ethical concerns such as data privacy, algorithmic bias, and the digital divide have increasingly emerged as significant challenges for professionals in management information systems. Nevertheless, within the current curriculum framework, technology ethics education is frequently relegated to the status of additional chapters or class embellishments, lacking a systematic design for integration. While students acquire skills in information system development, they seldom engage in profound contemplation of fundamental questions such as who does technology serve?, how should values be prioritized?, and how can risks be mitigated and controlled? This insufficient ethical awareness may pose a latent risk for the misuse or even abuse of technology in the future.

### 3. Theoretical Framework for AI-driven Blended Teaching in MIS

In light of the aforementioned structural challenges, the integration of AI technology offers a transformative opportunity for the blended teaching of Management Information Systems (MIS) courses, shifting from mere repair to comprehensive reconstruction. This study synthesizes socio-cultural theory and distributed cognitive theory, incorporating advanced concepts such as “human-computer-interpersonal collaboration” and “teaching, learning, evaluation, and research”. A theoretical framework is developed, centering on “cognitive spiral development”, with AI technology intricately embedded throughout the entire teaching process.

The central concept of the framework is to transform AI from a mere auxiliary tool into a cognitive subject and teaching agent that collaborates with both teachers and students. AI is no longer simply a medium for content presentation; it has evolved into a cognitive partner capable of intelligent diagnosis, dynamic generation, instant feedback, and strategy optimization. In the context of teaching, AI serves as an “intelligent lesson planning assistant”, aiding

teachers in constructing a dynamically updated knowledge map by analyzing numerous academic frontiers and industrial cases. In the realm of learning, AI transcends its role as a content presenter to become an adaptive learning companion, which designs personalized learning paths and provides differentiated learning resources based on students' learning profiles and real-time performance. Regarding evaluation, AI functions as a multidimensional analyzer, a tool that not only quantifies learning outcomes accurately but also captures the emotional states and cognitive trajectories throughout the learning process, thereby facilitating comprehensive and multimodal dynamic evaluation. In the realm of research, AI serves as a collaborative inquiry partner, aiding students in literature mining, data modeling, and program optimization during project work, while also fostering their higher-order thinking and innovative capabilities. These four dimensions are interconnected, mutually reinforcing one another and evolving cyclically through the interactions among “teacher-student-student-student-machine”. This dynamic collectively propels students' cognitive development from “knowledge acquisition” to “ability construction”. Ultimately, this process facilitates a qualitative transformation from learning to knowing how to learn, and subsequently to effective creation.

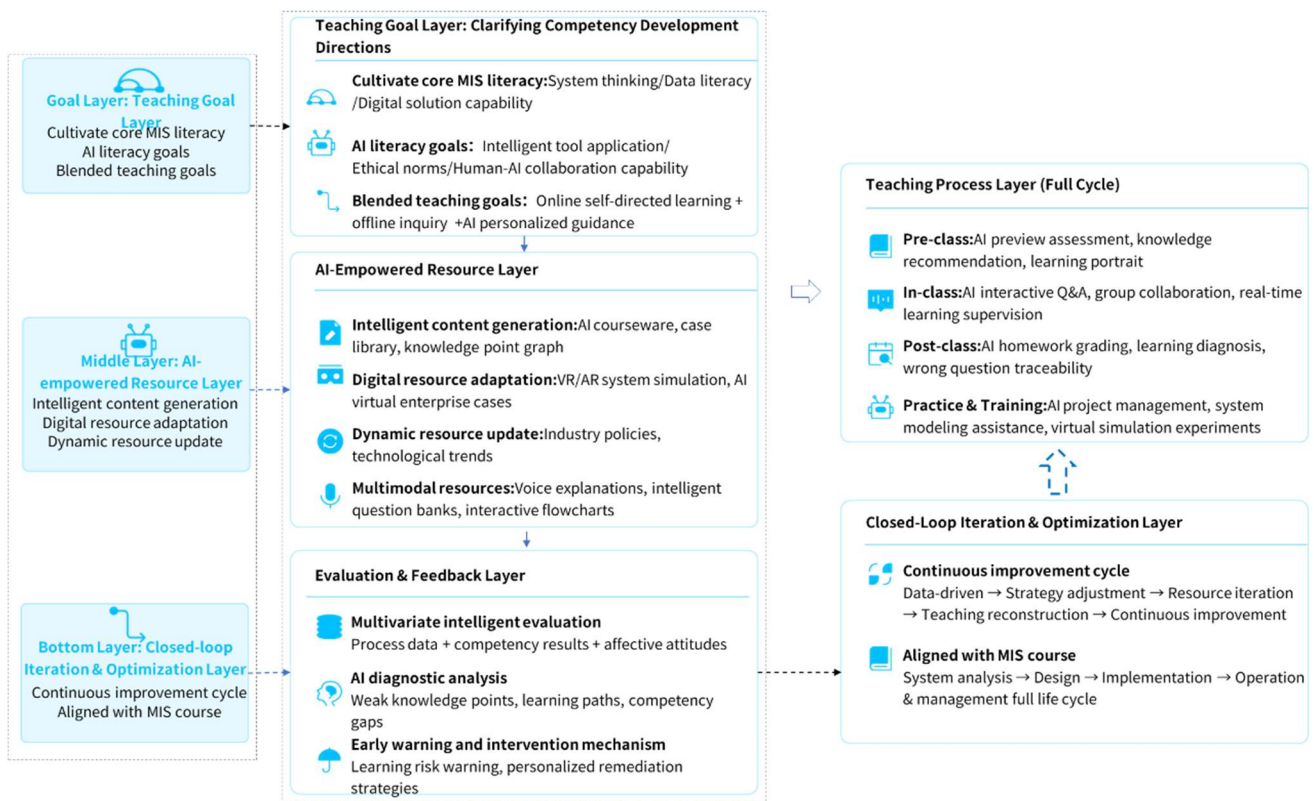


Figure 1. AI-Enabled Blended Teaching Improvement Framework

### 4. Optimization Paths for AI-Supported MIS Blended Teaching

Building on the aforementioned theoretical framework and considering the characteristics of the MIS course, this paper presents core optimization and improvement strategies, illustrated in Figure 1 below. The objective is to establish a precise, dynamic, collaborative, and resilient smart teaching ecology.

#### 4.1. Dynamic Content and Knowledge Mapping for Vivid Course Teaching

The knowledge system of Management Information Systems (MIS) courses is inherently cross-disciplinary and time-sensitive, rendering the static content of traditional textbooks inadequate to keep pace with the rapid technological advancements characterized by Moore's Law. To address this challenge, the primary strategy involves constructing a living dynamic knowledge base utilizing generative AI. Educators can employ AI tools to monitor real-time developments in the field of management information

systems, automatically capturing and integrating the latest case studies, academic articles, and industry reports. This approach facilitates the organic integration of classical theory and cutting-edge practice, thereby overcoming the stagnation of teaching content. Additionally, it is essential to develop a course-specific intelligent knowledge map that connects discrete knowledge points within a mesh structure and presents them to students through visualization technology. This map serves not only as a navigational tool for knowledge but also as a dynamically evolving knowledge life form. It can intelligently recommend relevant knowledge points based on students' learning trajectories and inquiries, assisting them in constructing a systematic and structured knowledge framework while mitigating the cognitive bias of only seeing the trees but not seeing the forest.

#### **4.2. Human-Computer Collaborative Inquiry Learning for Deep Practice**

Given the shortcomings of traditional teaching methods, particularly the limited focus on individual practical links and the inadequate development of higher-order thinking, it is essential to reconstruct an inquiry-based learning model centered on human-computer collaboration. In project-based learning within management information systems courses, artificial intelligence (AI) can assume various roles. During the project initiation phase, AI acts as a creative stimulator, engaging students in multiple rounds of dialogue to generate innovative ideas and providing information problem scenarios relevant to enterprises of varying sizes and industries. In the project design phase, AI functions as a solution optimizer, assisting students with business process modeling, system architecture design, and technology selection, while simulating potential solution flaws through red team drills to encourage critical questioning and debate among students. In the project development phase, AI serves as both a code assistant and test engineer, helping students navigate specific technical challenges, thereby allowing them to concentrate on business logic and system value rather than becoming mired in intricate technical details. Finally, during the project reporting phase, AI takes on the role of a simulated defense officer, pre-evaluating and questioning students' plans against established evaluation criteria, which aids students in identifying gaps and enhances their reflection and communication skills. Through this exploratory learning of deep human-machine collaboration, students can truly internalize knowledge into the ability to solve complex engineering problems in the cycle of diagnosis-design-interaction-practice.

#### **4.3. Multi-dimensional Data-Driven Accurate Evaluation and Learning Feedback**

The traditional evaluation method of one test determines the outcome fails to adequately capture students' genuine engagement and development within the blended learning environment. An AI-driven evaluation system should transition to a smart assessment model of process + result, facilitating a shift from experience judgment to data-driven evaluation. First, it is essential to establish a comprehensive data collection system that employs learning analytics technology to automatically record and integrate students' digital footprints across online platforms. Second, the development of a multimodal evaluation model should assess not only what students learn but also "how they learn" and "how well they learn". For instance, AI can utilize natural

language processing technology to analyze students' speeches and project reports in forums, evaluating their depth of thought and logical rigor. Ultimately, this approach will generate a visual personal ability radar chart and a dynamic growth profile, providing students with precise, immediate, and personalized learning feedback. This feedback will enable students to gain a clear understanding of their strengths and weaknesses, allowing for targeted self-adjustments and effectively achieving the goal of promoting learning through assessment while teaching students in accordance with their aptitude.

#### **4.4. Technology-Ethics Integration for Sound Educational Orientation**

As technology advances rapidly, it is essential to remain vigilant regarding its potential ethical risks, ensuring that the original intention of educating individuals about "technology for good" is not overshadowed by instrumental rationality. AI-driven educational reform must integrate ethical concepts and humanistic care throughout its framework. The curriculum should include a module on "Information System Ethics" to encourage students to examine real-world issues such as data privacy, algorithmic bias, the digital divide, and AI accountability. This approach will enable students to master technology while also fostering a capacity for deep ethical reflection. In the instructional process, educators should model appropriate behavior by guiding students in the correct and standardized use of AI tools, clarifying the parameters of academic integrity, and mitigating cognitive dependence on AI as well as intellectual inertia. In the project report, students must clearly indicate which sections were completed with AI assistance, detail their core contributions, and enhance their understanding of academic integrity. Concurrently, AI technology is employed to create intelligent scenarios for "curriculum ideological and political education". By simulating the decision-making dilemmas associated with enterprise informatization construction, students are encouraged to reflect on the social responsibilities and familial and national sentiments linked to technology application. This value guidance is seamlessly integrated into the entire process of knowledge transfer and skill development, ensuring that technological empowerment consistently aligns with the fundamental objective of fostering moral integrity and cultivating individuals.

### **5. Conclusion**

AI technology is profoundly transforming higher education in both depth and scope. This study examines the management information system course, which exemplifies a curriculum characterized by significant theoretical depth and practical breadth. It systematically analyzes structural challenges inherent in the traditional blended teaching model, including outdated content, superficial practice, limited evaluation methods, and insufficient attention to ethics. Building upon contemporary theories and practical insights from AI-enabled education, we developed a four-dimensional theoretical framework centered on cognitive spiral development. Furthermore, we propose four optimization strategies: dynamic content generation, human-machine collaborative inquiry, multidimensional data evaluation, and the integration of technology and ethics. These strategies represent a cohesive set of systematic solutions designed to activate the intrinsic dynamics of the teaching system and

transform the educational ecology.

The ongoing advancements in general artificial intelligence technology, exemplified by DeepSeek, present new opportunities for the reform of Management Information Systems (MIS) courses. Future research and practice should concentrate on several key areas: first, developing a more specialized depth of intelligence that aligns with the discipline's nature, thereby achieving a micro-learning flow design characterized by the principle that "simple is complex"; second, establishing a stable governance structure that fosters synergy among teachers, machines, and students. This governance framework must effectively mitigate risks while harnessing the benefits of technology, ensuring that the humanistic aspects of education are preserved. Additionally, it is essential to integrate authentic enterprise application scenarios into the classroom through a deeper collaboration between industry and education, facilitating a precise alignment between talent development and societal needs. Only through this reciprocal interaction between technology and education can we fully comprehend this significant transformation and cultivate innovative management professionals who are adept with intelligent tools, possess a deep understanding of systemic dynamics, and are prepared to address the challenges of our time.

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