

# Construction and Practice of an AI General Education Teaching Model for Liberal Arts and Management Disciplines under the “AI+HI” Dual-Engine Drive

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**Abstract:** The swift advancement of generative artificial intelligence (AI) is bringing fundamental changes to how knowledge is produced and to the delivery of general education at colleges and universities. Nevertheless, AI general education courses designed for students in liberal arts and management programs continue to encounter a range of entrenched problems: learners' comprehension of AI capability boundaries tends to remain at a surface level, the transfer of disciplinary knowledge into professional settings is frequently inadequate, AI-produced content poses threats to the credibility of formative assessment, and human-AI collaborative thinking receives insufficient attention in training. In light of these concerns, the present study, built upon the Outcome-Based Education (OBE) framework and theories of human-AI collaborative learning, puts forward a dual-engine teaching model driven by “AI+HI” (Artificial Intelligence + Human Intelligence). Through the guiding principle of “machine computation, human deliberation,” the model articulates the educational boundary of human-machine collaboration and creates a twin-track mechanism in which AI boosts efficiency and expands scale, whereas HI fosters value formation and elevates instructional quality. The model also outlines a four-dimensional implementation route covering cognitive reconstruction, scenario-based empowerment, process-based evidence generation, and thinking development, and it reshapes the interaction mechanism among teachers, students, machines, and the environment while instituting a three-tier verification-based evaluation framework that combines AI preliminary screening, instructor review, and randomized oral defense. Anchored in the Chaoxing learning platform and industry-education integration bases, the model further

builds an organized resource system composed of discipline-specific scenario case libraries and prompt template repositories. Ultimately, the study endeavors to close the gap between technological instrumental rationality and humanistic value orientation in large-scale general education classrooms, thereby offering a transferable theoretical framework and a practical route for developing and pedagogically transforming AI-enabled general education courses in liberal arts and management disciplines.

**Keywords:** Artificial Intelligence General Education; Liberal Arts and Management Disciplines; AI+HI; Human-AI Collaboration; Teaching Model

## 1. Introduction

The shortage of AI talent is felt most strongly in regions such as Guangxi, which is a gateway between China and ASEAN. These regions need humanities and management graduates who can use AI tools, reason with data, and work with AI systems when making decisions. For first-year students, introductory AI courses offer a way to develop basic digital literacy while also meeting a policy requirement [1].

Although these courses are now widely offered, teaching them well to students with weak mathematics and programming backgrounds remains a challenge. Large language models offer opportunities for teaching. However, they also bring risks related to cognitive offloading and academic integrity [2].

Four difficulties have been observed in teaching Introduction to Computational Thinking and Artificial Intelligence (For Humanities and Management Students). First, students misjudge AI's abilities; they move between seeing it as all-powerful and fearing that it will replace human labor. These shifts lead students to rely on the tools without understanding them well and to

accept AI-generated content without questioning it. Second, course content is not closely linked to workplace tasks. Students may know how to operate a tool but still struggle to use it effectively in management tasks such as financial analysis, marketing content creation, and HR resume screening. Third, AI-generated work makes assessment based on final products difficult to maintain; the authenticity of submitted work is hard to confirm, and prompt design and critical thinking are difficult to assess [3]. Fourth, students' computational thinking skills are weak, and their awareness of human-AI collaboration is limited; they therefore lack a structured way to deal with complex problems in their field [4].

These problems share common roots: the boundary between technical tools and human agency is unclear; assessment systems lag behind the technologies they are meant to assess; and different types of thinking training are separated from one another. Reform in large-scale general education must balance technical efficiency with humanistic values. Repeated practice with AI tools is not enough. Reflection and the learning process deserve the same attention as tool operation and final output. This study therefore argues for restructuring the whole educational ecosystem, drawing on outcome-based education (OBE) and human-AI collaborative learning theory. On that basis it proposes an "AI+HI dual-engine" teaching model that defines the responsibilities of AI and human teachers. The AI engine delivers knowledge at scale and collects learning process data. Efficiency and coverage improve. The HI engine provides value guidance and supports discussions of ethical issues, with the aim of ensuring educational quality and promoting humanistic development.

This study provides a theoretical framework and outlines how to apply the model in humanities and management education. It aims to reduce AI-assisted academic misconduct, help students use what they learn across fields, and improve their ability to work with AI.

## **2. Theoretical Logic and Architectural Design of the "AI+HI" Dual-Engine Teaching Model**

### **2.1 Theoretical Foundations**

#### **2.1.1 Capability Decomposition under Outcome-Based Education (OBE)**

This study uses backward design within the Outcome-Based Education (OBE) framework. It starts from the intended learning outcomes [5] and

works out what core competencies students need. For students in liberal arts and management programs, the intended learning outcomes break down into four competencies: making sound and well-grounded judgments, applying knowledge in domain-specific settings, reasoning from evidence in real processes, and making decisions in collaboration with AI. Based on this framework, the course content is reorganized into a chain of linked tasks. The chain forms a full loop: learning gains build up over time, and teaching keeps improving as the course runs.

#### **2.1.2 Reshaping the Educational Ecosystem through Human-AI Collaboration**

Generative artificial intelligence (GenAI) is changing what education needs to do. In response, this study proposes a teaching approach based on human-AI collaboration. Teaching thus becomes a socio-technical system, in which human intelligence and AI each take their own share of the work.

Earlier work describes the digital transformation of education as a reconstruction of intelligence through human-AI collaboration [6]. Following this view, our restructuring moves teaching away from "technology demonstration" and toward "scenario-driven empowerment." Through real tasks and actual work processes, students can see clearly where the responsibility lies between humans and AI.

## **2.2 Internal Logic and Boundary Clarification of the "AI+HI" Dual-Engine Collaboration**

#### **2.2.1 AI component: External cognitive support and data infrastructure**

The AI system takes on the teaching tasks that follow fixed procedures and draw on large volumes of data. That kind of task scales. As students learn, it helps them sharpen a prompt, clarify a concept, or correct an error. It also logs their interactions along the way. That frees teachers from repetitive work and lets the course reach more students.

#### **2.2.2 HI component: Value guidance and higher-order thinking**

Human instructors guide students in thinking about values and help them develop higher-order thinking. They use real cases involving professional issues and ethical dilemmas as teaching materials, then organize class discussions and critical reflection around these cases. When important decisions need to be made, instructors provide detailed feedback; the aim is to keep human development, ethical reasoning, and

critical thinking central to education.

### (3) Collaboration boundary

The model assigns different roles to machines and instructors. Machines identify patterns, process information, and prepare first drafts. Instructors set goals, review results in context, and make value judgments. AI speeds up cognitive work. Instructors retain authority over what counts as valid knowledge. They also take final responsibility for ethical oversight. This arrangement keeps teaching efficient without giving up educational integrity.

## 2.3 Overall Architecture of the “Teacher–Student–Machine–Environment” Teaching Model

The study develops a teaching framework with four layers: objectives, content, implementation, and evaluation. The implementation layer covers daily teaching activities. It is where students, AI agents, teachers, and the learning environment come together.

Students explore questions and complete practical tasks in physical and virtual settings. Repeated practice and reflection build understanding. AI agents plan a learning path for each student and give feedback at once. They also keep a traceable record of what each student does. Their support shifts as students progress. Teachers design the activities and guide students through them, using learning analytics to spot where support is needed. That work also builds higher-order thinking. The learning environment links online data flows with offline practical work, and classroom activity stays close to real industry practice.

## 3. Implementation Pathways of the “AI+HI” Dual-Engine Teaching Model

Based on the theoretical framework of the “AI+HI” dual-engine model, this study aims to help liberal arts and management students build four core competencies. Guided by the teacher–student–AI–environment interaction mechanism, we design four connected implementation routes: cognitive reconstruction, scenario-based empowerment, process-based evidence generation, and thinking development. Together, these routes turn teaching away from knowledge delivery and tool use. Scenario-driven learning takes their place, with competency development tied to evidence.

### 3.1 Cognitive Reconstruction

This study develops a cognitive intervention

model that runs in three stages. Students explore a sandbox before class, compare and deconstruct cases in class, and consolidate what they have learned after class.

Before class, the AI system uses algorithm visualization tools to explain how large language models work. Students run financial ratio analysis, marketing copy generation, and HR resume screening on three mainstream models. They compare the outputs. The system points out factual errors, gaps in reasoning, and possible ethical risks. Students can also ask for prompt corrections and concept explanations at any time. With that help, experimenting in the sandbox becomes easy.

In class, instructors examine three to five cases of AI-related professional misconduct. They use structured debates and Socratic questioning. The cases include distorted AI-generated financial reports, infringement from near-identical marketing content, and bias in algorithmic recommendations. These activities aim to help students question AI outputs and examine the rules behind them.

After class, instructors work with the AI system to create a cognitive heatmap. It brings together students’ initial prompts, revision histories, and emotional feedback markers. Teachers use these records to adjust their teaching strategies as students’ cognitive biases change. As the process repeats, students become more questioning and reflective. They learn to judge AI using evidence rather than emotional reactions.

### 3.2 Scenario-Based Empowerment

This approach replaces AI tool demonstrations with learning in real-world scenarios. We built a standardized case library for liberal arts and management programs. The library follows the Ministry of Education’s “Gold Course” standards: high-level, innovative, and challenging [7]. The cases cover more than ten real business contexts. Three of them: intelligent financial analysis, AIGC-driven marketing planning, and HR resume screening with compliance review.

Every case follows the same structure: teachers supply a business context and raw data with sensitive details masked. Standard prompt templates come next, followed by expert-validated answers. The materials stay authentic, tied to the discipline, and fit for teaching. Cases also carry examples of common errors and notes on ethical risks. Learning then runs in three stages: scenario introduction, workflow breakdown, and

iterative practice.

The AI prompt optimization engine compares each submission with industry-standard templates, scores it for accuracy, logical coherence, and compliance, and then suggests revisions. Students can make repeated attempts at little cost, and the system saves every version. Teachers step in at key decision points to cross-check financial indicators, adjust marketing audience profiles, and clarify the boundaries of labor-law compliance. That keeps the work close to real practice.

The platform records how often students revise prompts, how many suggestions they accept, and how well each prompt fits the discipline. Those records show where prompting is improving and help teachers decide where further guidance is needed. Students who pick up the skill quickly move on to tasks that span several domains. Those who struggle with logical reasoning receive individual tutoring.

### 3.3 Process-Based Evidence Generation

The assessment framework has four stages: data collection, AI preliminary screening, human review, and oral defense verification. The framework aims to address AI-assisted academic misconduct in formative assessment. It follows the process-oriented and value-added approach outlined in the Guidelines for Deepening Educational Evaluation Reform in the New Era [8].

The AI system records how students revise their prompts and how their outputs change from one version to the next. It also tracks interaction frequency and time on task. Preliminary screening comes next. Built-in plagiarism detection and basic logic checks cover formatting, content similarity, and factual errors. The results give instructors an objective basis for scoring.

Instructors review students' submitted work alongside the evidence the system has collected. That evidence lets them trace students' thinking. A multidimensional rubric developed in this study scores the work for AI applications in liberal arts and management, covering scenario fit, depth of ethical reasoning, and innovative thinking.

Each semester, a random sample of students takes part in live oral defenses. Students reconstruct the reasoning behind their key prompt designs on the spot and respond to hypothetical scenarios. System logs, instructor judgments, and live performance form an evidence chain that supports three-way cross-validation. Cross-validation on

this basis reduces the risk of AI-assisted academic misconduct and makes process-based assessment more reliable for evaluating students' critical thinking and prompt design skills [9].

### 3.4 Thinking Development

The pathway has four stages. Concept decomposition, scenario embedding, iterative optimization, and reflective internalization run in that order. Workflows for financial forecasting, public opinion analysis, and human resources inventory all run through AI. AI then guides students as they clean data, reason across scenarios in parallel, and tune parameters. The system records every revision students make. Step by step, students build computational thinking and data-driven reasoning.

Instructors guide students in AI ethics and higher-order decision-making. Ethics simulations help students examine technological limits and clarify human and machine responsibilities. Machines recognize patterns and prepare first drafts. Humans set goals, cross-check results, and make value judgments. This division supports the use of technology for good. It also helps students judge where AI use should stop.

The platform follows how students think across the whole learning cycle and turns that into radar charts that plot competency on several dimensions. Instructors read both. The interventions they then plan pair computational logic with guidance on humanistic values.

By the end, students deliberately apply computational thinking, data thinking, and iterative thinking to complex professional problems. They learn to work with AI and understand the ethical judgment required when using it [10, 11].

### 3.5 Resource Library Construction

To deliver the "AI+HI" dual-engine model to a high standard, the course has built a systematic, intelligent resource system on the Chaoxing learning platform and the industry-education integration bases. The materials no longer accumulate at random; they are now systematic, measurable, and upgradable over time, and they underpin all four reform initiatives. First, a discipline-specific case library covers the core domains: finance, marketing, human resources, and general management. Every case follows the six-element standard described above. Second, a structured prompt template repository follows a dual-matrix classification: "disciplinary

dimension (covering the various liberal arts and management majors)  $\times$  task type (data analysis, copywriting, report writing, decision support)". Each template carries role-setting frameworks, task description specifications, and output format requirements. The platform supports one-click invocation, personalized editing, and version rollback, so students can test ideas against industry benchmarks cheaply and almost without limit. Third, a library of principle visualizations and ethics cases is now in place. It holds more than ten interactive animated demonstrations that break down neural network mechanisms, large-model generation logic, and the formation of algorithmic bias, plus curated real-life AI misconduct cases: fabricated financial reports, discrimination from algorithmic recommendation, and deepfake fraud. Each case includes debate scripts, ethical analysis frameworks, and compliance checklists. These materials help maintain rigor in structured debates and Socratic questioning in the physical classroom.

#### 4. Practical Outcomes and Innovations

##### 4.1 Practical Outcomes

Implementing the "AI+HI" dual-engine teaching model has restructured the teaching ecosystem in four dimensions. The first concerns changes in students' thinking. Human-AI collaboration tasks move students from passive participation to designing AI-supported workflows. Students also take responsibility for ethical oversight in human-AI interactions. Their anxiety about AI has decreased markedly. They now have a more realistic understanding of its capabilities and limitations. Improvements are also seen in prompt engineering, scenario transfer within their disciplines, and awareness of data ethics. Students show gains in higher-order critical thinking and complex problem solving.

Second, the model has improved teaching resources and evaluation criteria. The structured scenario-based case library now contains more than ten discipline-specific cases. A prompt template repository and animations of key principles are also available. A rubric system supports process-based evidence evaluation. The Chaoxing platform has also gained four upgrades: knowledge graph navigation, learning trajectory collection, a four-dimension dashboard, and early warnings drawn from learning analytics. Together they give process-oriented assessment standard tools to work with under generative AI.

Third, the model has opened room for innovation in teaching research and institutional practice. Virtual teaching research communities meet monthly to plan lessons together, observe each other's classes, and cross-calibrate assessment rubrics. Out of that work comes a data-driven, dual-track approach to collaborative teaching: assessment standards hold steady across nine parallel classes, and course delivery improves.

Every lead instructor has now completed specialized training in generative AI applications for teaching, with skills in prompt engineering design and multimodal toolchain operation. Their capacity to design human-AI collaborative teaching has improved markedly.

The project should yield more than two teaching reform papers, a digital textbook, and professional development for two to three early-career teachers. There are also plans to apply for provincial-level teaching achievement awards.

##### 4.2 Model Features and Innovations

The model has three main innovations. First, it defines the boundaries of human-AI collaboration rather than simply adding AI to teaching. Under this dual-track arrangement, AI delivers knowledge at scale. It also collects data and provides basic feedback. Instructors are responsible for value guidance, logical deconstruction, and ethical reasoning. Regular calibration within virtual teaching research communities makes teaching decisions data-driven.

Second, the model uses a three-level verification mechanism to trace students' thinking during learning. Assessment includes both process evidence and final submissions. This gives academic evaluation a stronger basis in the context of generative AI.

Third, the model shifts from skills training to helping students internalize competencies. Structured thinking is developed within the task workflows of each discipline. Tool use, scenario-based practice, reflection, and competency growth support one another in a single learning cycle.

#### 5. Conclusion and Future Directions

This study develops an AI+HI dual-engine teaching model for liberal arts and management education. It addresses four recurring problems in AI general education. These are students' superficial understanding of AI, difficulty applying learning across scenarios, risks to assessment integrity, and weak collaborative

thinking. OBE and human-AI collaborative learning theory provide the basis for the model. Its guiding principle is "machine computation, human deliberation". The model separates technological instrumental rationality from humanistic value orientation. Implementation follows a four-dimensional pathway. A structured resource system supports it, as does a three-level assessment verification mechanism. The evidence points to four measures. Two clarify human-AI collaboration boundaries and rebuild scenario-based task chains; the other two evaluate learning process evidence and build dual-dimensional thinking competencies. None of them relies on AI alone.

Future work should link education and industry more closely through the AI animation production base. After foundational training, students can join real commercial projects in a "learn–practice–create–reward" setting. Successful projects have their sensitive information masked before entering the course resource library. This creates a cycle linking classroom learning, practice at the base, and industrial validation.

The project also plans to release a guide for setting up the model and an open-source resource package. Both will be available as open educational resources. The project will draw on Guangxi's position as a digital economy hub between China and ASEAN to reach comparable institutions. This expansion will help cultivate interdisciplinary talent in liberal arts and management with digital adaptability and awareness of humanistic values.

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