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Integrating AI General Education with Digital Literacy Cultivation and Cognitive Construction in Industry-Specific Universities

Yuzhi Hu

School of General Education, Moutai Institute, Renhuai, China
huyuzhi@mtxy.edu.cn

Abstract. Artificial intelligence has evolved into a general-purpose technology that permeates nearly every corner of knowledge production and social governance. This transformation is pushing college students' digital literacy far beyond the traditional "digitization" benchmark toward what this paper terms "intelligent-digital" literacy. For industry-specific universities—institutions committed to serving specific industries and cultivating application-oriented talents—the significance of AI general education is perhaps even greater than for other types of universities, because their graduates directly enter the industrial chain. Taking the practice of Moutai Institute as a concrete case, this paper elaborates on the internal logic, practical challenges, and feasible pathways for integrating AI general education into students' digital literacy cultivation and cognitive construction. The core argument of this paper is that such education should be anchored in industrial scenarios rather than abstract theory, and that cultivating compound talents equipped with digital literacy, industrial awareness, and social responsibility requires simultaneously grasping three main threads: technological empowerment, value guidance, and cognitive construction. On this basis, this paper proposes a trinity integration framework and offers actionable strategies from four dimensions: curriculum system, teaching model, faculty development, and evaluation mechanism. This paper aims to provide theoretical reference and practical insights for general education reform in industry-specific universities.

Keywords: Industry-specific universities, AI general education, Digital literacy, Cognitive construction

1. Introduction

The speed at which artificial intelligence has risen from a niche research topic to an indispensable tool in daily life can hardly be overstated. The development of general-purpose large models has far exceeded expectations, and the "AI+" initiative is rapidly penetrating virtually every industry. As a result, AI is no longer a frontier novelty reserved for specialists; it has evolved into a general-purpose technology capable of reshaping the overall economic and social landscape, and with it, the relations of production in knowledge and education. A highly representative policy signal emerged in 2025—when nine ministries and commissions, including the Ministry of Education, jointly issued

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the *Opinions on Accelerating the Digitalization of Education* [1], which called for the coordinated advancement of integrated AI education across primary, secondary, and higher education, encouraged universities to build "general + distinctive" AI general education courses, and incorporated digital literacy into comprehensive quality assessment. Regardless of how one interprets the details, the direction is unmistakable: AI general education has been elevated to the core of national educational strategy.

From the perspective of digital sociology, the rise of AI is pulling human society into a new stage that can aptly be called the "intelligent-digital era." Data-driven, algorithm-led logics now permeate knowledge production, social interaction, and public life. This trend has a particularly profound impact on industry-specific universities. These institutions are oriented toward serving specific industries and cultivating high-quality application-oriented graduates, and their graduates directly take up key positions in the industrial chain. As intelligent technologies become deeply embedded in production, the digital literacy and cognitive development of such students concern not only their individual career development but also the talent foundation supporting industrial digital transformation.

All of this transforms digital literacy from a professional skill into a basic requirement for participating in modern life. What further complicates the situation is the structural imbalance: college students are nominally "digital natives," yet their actual literacy and cognitive levels lag far behind their usage habits. Data collected over the past three years through teaching surveys in the "Information Literacy and Literature Retrieval" course confirm this—students frequently use AI tools, but their deep understanding of the underlying mechanisms remains weak (Table 1).

Table 1. Empirical data on college students' AI usage and literacy

Indicator	Survey Result	Data Source
AI tool usage rate	99.2% of surveyed students use AI	College Student AI Usage Survey
High-frequency dependence	47.1% admit they "cannot live without AI"	Same as above
First choice when encountering problems	65.9% prefer AI first	Same as above
Received formal training	Only 4.2% have received formal training	Same as above
AI anxiety ratio	43.5% experience varying degrees of AI anxiety	Same as above
Concern about intellectual inertia	62.3% worry about "losing independent thinking ability"	Same as above

These data depict a paradox worthy of serious consideration: students are generally adept at operating intelligent tools, yet their digital ethics, information discrimination ability, critical thinking, and grasp of AI's social consequences remain relatively weak. In industry-specific universities, this paradox carries an additional layer of specificity because industrial scenarios impose extra requirements—students' understanding of how intelligent transformation is unfolding within their industry, and of the forms that intelligent applications will take in their future positions, clearly requires the systematic guidance that only general education can provide. This is precisely the entry point of this study.

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General education, which has always aspired to cultivate "complete persons" rather than merely "professional persons," enjoys a natural advantage here: it can transcend the knowledge-centered paradigm and place humanities and technology within a unified framework. The *Red Book on College Students' AI Literacy (2024 Edition)* [2], published by Zhejiang University, defines AI literacy as an organic whole composed of "systematic knowledge, constructive ability, creative value, and humanistic ethics," with knowledge as the foundation, ability as the priority, value as the guide, and ethics as the essence. Integrating AI general education into the general education system of industry-specific universities is not only a timely response to national policy but also the proper meaning of such institutions riding the digital wave, constructing students' scientific cognition, and serving industrial transformation and upgrading.

Methodologically, this paper relies on literature research and case analysis, using the Moutai Institute as the empirical anchor, to trace the internal logic, practical challenges, and implementation pathways of integrating AI general education into digital literacy cultivation and cognitive construction.

2. Results

2.1. Conceptual definition of industry-specific universities and AI general education

What makes a university an "industry-specific university"? Essentially, such institutions are established based on a specific industry and are missioned to serve industrial development and needs. They exhibit distinct industrial attributes, strong application orientation, and the fusion of general education with professional education. Within China's higher education system, this concept encompasses two major groups. One category comprises traditional industry-affiliated institutions rooted in energy, transportation, postal and telecommunications, agriculture and forestry, and petrochemical industries. The other consists of distinctive application-oriented universities established by large enterprise groups. Moutai Institute belongs precisely to the second category—an industry-specific, application-oriented undergraduate institution founded by Kweichow Moutai Group. With its unique program in baijiu brewing engineering, it has formed an irreplaceable disciplinary cluster in brewing science, anchored on the liquor industry chain, and adheres to the educational philosophy of "small but refined, high quality, distinctive, and open," committed to cultivating application-oriented talents who "understand craftsmanship, master technology, and bear responsibility." It possesses the potential to build a nationally distinctive specialty cluster, aligning with the Ministry of Education's "Double Excellence" project that encourages the development of industry-specific, application-oriented universities.

In contrast, AI general education is a form of universal education oriented toward all students. It does not aim to cultivate professional AI engineers but rather to popularize foundational AI knowledge and construct the broad literacy required for the intelligent era. Its three characteristics are particularly prominent: fundamentality—the goal is to establish a scientific cognitive foundation for AI rather than delve into algorithmic details; universality—it covers all majors and all levels, with a broad interdisciplinary reach; and humanism—it insists on examining technology within a broader social, ethical, and cultural framework, embodying the deep pursuit of general education in cultivating whole persons.

The *White Paper on a Layered and Categorized AI General Education Curriculum System* [3], published by the Chinese Association for Artificial Intelligence, further proposes that AI general education should comprise four closely interconnected components—"Know AI," "Use AI," "Create AI," and "Govern AI." The logic is iterative and progressive: from knowledge acquisition to

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capability enhancement, from capability cultivation to literacy shaping. For industry-specific universities, we should add a fourth connotation with distinctly industrial characteristics: applicability. That is, AI general education should take root in concrete industrial scenarios, integrate AI topics with industry applications, and help students grasp not only general technological logic but also the specific application pathways and value boundaries of intelligent technology within their own industries.

The distinction between AI general education and AI professional education is far from a semantic issue. Professional education emphasizes technological development and creation, aiming to cultivate talents who build and advance AI theory and technology. General education, by contrast, focuses on the foundational knowledge, skills, and values that every worker in the intelligent era should understand and master. For industry-specific universities, this distinction is of great significance because their graduates may never become AI developers—but they must become practitioners who can understand intelligent technology, skillfully apply it, and prudently treat it within the industries they serve.

2.2. The progressive evolution from digital literacy to intelligent-digital literacy

Digital literacy is not a fixed target; its concept continues to evolve. Early research tended to emphasize operational skills with digital tools [4]. As the information environment has grown increasingly complex, researchers have come to view digital literacy as a multidimensional capability encompassing cognition, emotion, ethics, and values. In 2025, the National Education Digitalization Strategy further advanced this process [1], listing the improvement of teachers' and students' digital literacy as a key task and calling for the establishment of an integrated cultivation system spanning from primary school through university.

Against the backdrop of AI becoming increasingly embedded in knowledge production, the old "digital literacy" is being called upon to upgrade into a new form more aptly termed "intelligent-digital literacy." Research indicates that college students need to leap toward a comprehensive capability that integrates information discrimination, value creation, human-machine collaboration, and a sense of responsibility. For industry-specific universities, digital literacy must be fused with industrial competence rather than floating as a generic skill. Synthesizing the above threads, the digital literacy of students in industry-specific universities can be summarized into four interrelated dimensions, whose structure and progressive relationships are presented in Table 2.

Table 2. Four-dimensional structural model of digital literacy for students in industry-specific universities

Literacy Dimension	Core Connotation	Industrial Extension
Digital Technology Literacy	Operation of intelligent devices, software tools, and online platforms	Application of industry-specific intelligent equipment and platforms
Digital Information Literacy	Retrieval, discrimination, evaluation, and critical use of information	Industry data analysis and decision-making

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Table 2. (continued)

Digital Communication Literacy	Online communication, collaboration, and self-protection	Industry intelligent collaboration and digital commerce
Digital Ethics Literacy	Awareness and practice of privacy, intellectual property, data security, and algorithmic fairness	Industry data security and intelligent ethics responsibility

These four dimensions progress layer by layer, from the foundational to the advanced, from skills to values. In this process, they acquire concreteness and contextualization within industrial scenarios, collectively constituting the capability foundation required for students in industry-specific universities to participate in the intelligent transformation of their industries.

2.3. The theoretical threads of cognitive construction

The theoretical roots of cognitive construction can be traced to the convergence of constructivist learning theory and cognitive construction theory. The classical lineage runs through Piaget's cognitive constructivism, Vygotsky's sociocultural theory, and Bandura's social learning theory [4]. Constructivism maintains that knowledge is not passively received and objectively transmitted but is actively constructed through the interaction between the subject and the environment. Sociocultural theory emphasizes the mediating role of social interaction and cultural tools in cognitive development, stressing that learning occurs within collaborative construction in the "zone of proximal development." Social learning theory further supplements that individuals acquire social behaviors by observing role models and drawing on vicarious experience.

For AI general education in industry-specific universities, the function of cognitive construction is best understood as helping students build a complete cognitive schema around the "AI-industry-society" relationship. This is not the accumulation of knowledge but rather the gradual formation, through industrial practice, discussion, and value reflection, of deep understanding of issues such as the pros and cons of specific technologies, ethical boundaries, impacts on one's own industry, and one's own responsibilities within it. In the multidimensional interaction of "technology-industry-individual-society," students in industry-specific universities can complete layer-by-layer leaps through AI general education—from instrumental cognition to value-based cognition, from individual cognition to social cognition, from job cognition to industrial cognition—ultimately forming a rational, comprehensive, and responsible understanding of their identities as "digital professionals" and "digital citizens."

3. The intrinsic relationships among AI general education, digital literacy, and cognitive construction in industry-specific universities

3.1. AI general education: an integrated carrier for enhancing digital literacy

Digital literacy does not develop spontaneously; each of its dimensions depends on systematic educational guidance. In industry-specific universities, it is difficult to imagine a more natural integrated carrier than AI general education.

Let us consider each layer. At the level of technological literacy, AI general education courses push students beyond superficial "how to operate" toward a genuine grasp of how intelligent

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technologies function within industrial scenarios—achieving the understanding transition from "knowing the what" to "knowing the why." At the level of information literacy, the data, algorithms, and model training provided by these courses strengthen students' ability to judge the authenticity of information, evaluate information sources, and resist cognitive manipulation—which is crucial for rational decision-making in the future big-data industrial environment. At the level of ethical literacy, common AI general education topics such as algorithmic discrimination, privacy infringement, and deepfakes directly address the core concerns of digital ethics, while also relating to industrial data security and compliance of intelligent applications. The key point is that AI general education is not a simple superimposition of these dimensions; it should be understood as a pivotal fulcrum that connects and elevates these dimensions as a whole—an integrative advantage that other course forms find difficult to replicate.

3.2. AI general education: promoting deep construction of cognitive abilities

There is hardly a corner of industry and society that AI does not touch. Its influence extends to employment structure, social equity, cultural dissemination, and social governance, unfolding simultaneously at multiple levels. For students in industry-specific universities, AI general education provides a pathway through this complexity: by systematically presenting the map of AI's industrial impacts, it helps students transcend purely instrumental interpretations of technology and establish the holistic framework of "technology embedded in industry, industry embedded in society."

Empirical evidence shows that many students currently occupy an uncomfortable position in the cognitive dimension. The *Survey on College Students' AI Usage Behavior and Mindset* reveals that 43.5% of surveyed students experience varying degrees of AI anxiety, with concerns concentrated in three areas: 62.3% worry about "intellectual inertia and loss of independent thinking," 53.7% worry about "emotional dependence and estrangement from those around them," and 46.3% worry about "the deterioration of real social skills." These data make the need concrete and specific: students in industry-specific universities equally require systematic education to form a scientific understanding of the "human-technology, technology-society, technology-industry" relationship—and in the process cultivate rational, prudent, and responsible technological attitudes and an appropriate sense of industrial responsibility.

3.3. The bidirectional interaction mechanism between digital literacy and cognitive construction

Digital literacy and cognitive construction are not independently achieved; they nourish each other in bidirectional interaction. On the one hand, solid digital literacy lays the foundation for sound cognitive construction—students who can discriminate information and think critically are generally better able to rationally evaluate the social impacts of technology and resist being swept along by one-sided or misleading narratives. On the other hand, mature cognitive construction guides the direction of digital literacy use, keeping technical capabilities aligned with proper value orientations and preventing misuse. In industry-specific universities, this bidirectional cycle extends to the dimension of "industrial cognition": mature industrial cognition directs students' digital literacy toward the correct direction of industrial intelligent transformation, while solid digital literacy in turn nourishes the formation of scientific cognition about intelligent industrial applications. AI general education sits precisely at these points of convergence, achieving the synergistic enhancement of digital literacy, cognitive construction, and industrial cognition through the organic unity of knowledge transmission, capability training, and value shaping.

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4. The practical challenges of AI general education in industry-specific universities

4.1. Ambiguous course positioning and insufficient industrial integration

Several industry-specific universities have already offered AI-related general education courses, but problems of ambiguous positioning and fragmented course systems are widespread. Some courses indiscriminately copy the AI general education model of comprehensive universities, piling up general technological principle instruction that exceeds the scope of general education and lacks visible connections to industrial scenarios. Others remain at the level of superficial application experience, lacking systematic integration of industry-specific application contexts. In many cases, course content fails to respond coherently to the dual goals of digital literacy and cognitive construction, and the expected chain of "general cognition–industrial application–value shaping" has never truly formed. Survey data corroborate this concern: although 99.2% of college students use AI, only 4.2% have received formal training. For most students in industry-specific universities, AI cognition remains in a state of "self-directed exploration and fragmented accumulation."

4.2. Overemphasis on technical teaching and neglect of value and cognitive guidance

Instrumental rationality casts a long shadow over many such courses. In several industry-specific universities, AI general education places teaching emphasis on tool operation and skill training while paying insufficient attention to the deeper issues AI raises—ethical dilemmas, social impacts, and value choices. This "skills-over-ethics" orientation may enhance students' technical proficiency in the short term, but it struggles to construct their digital ethical awareness and cognitive abilities, and may even induce blind worship of technology or a sense of helplessness in the face of it. For industry-specific universities, the consequences of this shortcoming are particularly pronounced. Without value-dimension reflection, students easily understand AI merely as an efficiency tool while neglecting its ethical responsibilities and social impacts in industrial transformation. This diverges considerably from the essential purpose of general education—cultivating complete persons and responsible industry professionals.

4.3. Weak faculty strength and insufficient cross-industry teaching capability

Teaching AI general education in industry-specific universities places high demands on faculty. Teachers need to master AI professional knowledge, possess a certain level of humanities and social science literacy, and—crucially—be familiar with industry application scenarios. In practice, teachers who simultaneously possess all these qualities are extremely rare. Teachers with science and engineering backgrounds usually have solid technical skills but weaker capabilities in industry and humanities interpretation; teachers with humanities and social science backgrounds may have limited grasp of technical principles; and teachers with industrial backgrounds, while familiar with production scenarios, often lack educational theory literacy. Cross-disciplinary, cross-industry collaborative teaching mechanisms have not yet been widely established, and this remains one of the most stubborn bottlenecks constraining the quality of AI general education in industry-specific universities.

4.4. Monotonous teaching models and lack of industrial scenarios

Examining the actual classroom reveals another problem: many AI general education courses still rely almost entirely on traditional lectures. This "lecture-indoctrination" style of teaching struggles

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to engage students. Students in industry-specific universities have different cognitive starting points and interests, and their learning motivation is closely tied to industrial career development. When course design does not provide contextualized, case-based, and industry-oriented content, it readily falls into the familiar inefficient cycle of "the teacher lectures, the students listen." Without industrial scenario experience and value analysis components, the goals of cognitive construction and industrial construction simply cannot be achieved. Compounded by the rapid iteration of AI technology itself, course content is continuously pulled between "timeliness" and "stability," and static course supply clearly struggles to keep pace with the constantly shifting technological environment.

4.5. Incomplete evaluation mechanisms and difficult-to-measure educational outcomes

Assessing the effectiveness of AI general education in industry-specific universities remains challenging. Existing evaluation relies heavily on paper-based examinations to test knowledge mastery, lacking scientific tools and standards to measure deeper educational goals—comprehensive performance of digital literacy, transformation of cognitive construction, industrial application capability, and the formation of value attitudes. The rise of AI-assisted learning makes this problem even more intractable, because distinguishing students' genuine growth from the masking effect of tool capabilities has become a core challenge of evaluation reform. The resulting misalignment in evaluation orientation, in turn, constrains the improvement of course content and teaching methods, making it difficult for AI general education in these institutions to form the virtuous cycle of "evaluation promoting teaching, evaluation promoting learning."

5. Practical exploration of AI general education at moutai institute

5.1. Moutai institute as an industry-specific university

Moutai Institute provides a concrete observational window for all of this. Founded by Kweichow Moutai Group Co., Ltd., the institute is located in Renhuai City, Guizhou Province—the core region of China's sauce-aroma baijiu production. Its motto, "Virtue and talent, broad learning and fine brewing, constant pursuit of excellence, steadfast dedication to action," proclaims its educational intent. With the liquor industry chain as its identity anchor, the institute interweaves the education chain, talent chain, industry chain, and innovation chain. It has constructed a fusion mechanism of "famous-enterprise collaboration + school leadership + multi-party cooperation," under which the institute and Moutai Group and related enterprises have jointly built more than 80 industry-education integration practice teaching bases, hired 65 industry mentors, and systematically cultivated more than 100 "dual-qualified" key teachers. Its educational model can be summarized as "the classroom connects to the workshop, and teachers are equivalent to masters."

The School of General Education of Moutai Institute is itself a product of the school's "college-to-university" reform. It undertakes the construction of general education courses for the entire university, organizing the curriculum into three major course module groups—"Reason and Science," "Cultural Interpretation and Aesthetics," and "Social Practice and Innovation"—and offering distinctive elective courses such as Moutai Aesthetics. All of this provides a solid foundation for integrating AI general education, and it is precisely Moutai Institute's positioning as an industry-specific university that makes it an appropriate case for exploring the integration of AI general education with digital literacy and cognitive construction.

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5.2. Constructing the "technological empowerment–value guidance–cognitive construction" trinity framework

Based on the analysis of the intrinsic relationships among the three elements and grounded in Moutai Institute's practice, this paper proposes a holistic framework for integrating AI general education with digital literacy and cognitive construction. The framework rests on three mutually supporting and mutually driving pillars: technological empowerment as the foundation, value guidance as the soul, and cognitive construction as the ultimate goal. The overall structure is presented in Table 3.

Table 3. Trinity integration framework at Moutai Institute

Dimension	Core Focus	Literacy Dimension	Industrial (Liquor Industry) Education Goal
Technological Empowerment (Foundation)	Principles and applications of intelligent tools	Digital technology literacy, digital information literacy	Know AI; use AI to serve the liquor industry
Value Guidance (Soul)	Digital ethics and value orientation	Digital ethics literacy	Use AI prudently; shoulder industrial responsibility
Cognitive Construction (Goal)	Cognition of AI's industrial and social impacts	Cognitive construction, critical thinking, industrial cognition	Critically examine AI; rationally drive industrial transformation

The three dimensions are not simply additive but dynamically interpenetrating and organically integrated, jointly pointing toward the educational goal of "knowledge as foundation, ability as priority, value as guide, and ethics as essence." If the framework works, its outcome will be high-quality, application-oriented talents possessing digital literacy, industrial cognition, and social responsibility.

5.3. Refining a layered and progressive AI general education curriculum system

Curriculum design is the backbone for industry-specific universities to implement AI general education. Combining the layering principle of "common core + disciplinary dimensions" with Moutai Institute's reality, this paper proposes a three-tier progressive structure: "general popularization–industrial integration–thematic deepening."

The first tier consists of AI general popularization courses for all students. Through courses such as *Introduction to Artificial Intelligence* and *Introduction to the Intelligent Society*, the basic principles, development history, typical applications, and social impacts of AI are systematically introduced, helping students establish a sound scientific cognitive foundation—this is the first rung of the digital literacy ladder. The second tier enters the industrial integration layer, oriented toward industrial scenarios and organized around Moutai Institute's distinctive topics: intelligent brewing, liquor industry digitalization, and intelligent liquor marketing. Integrated courses such as *Artificial Intelligence and Brewing* and *Artificial Intelligence and Liquor Marketing* embed AI applications directly into industrial contexts, strengthening students' ability to translate digital skills into industrial practice capabilities. This tier simulatestaneously undertakes the advanced training function for digital literacy and cognitive construction. The third tier consists of thematic seminar courses oriented toward specific contexts and hot topics—algorithmic governance, employment in

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the intelligent era, cybersecurity, and liquor industry digital transformation—achieving deep construction of cognition and industrial awareness through focused discussion.

All three tiers must confront the fact that students come from diverse disciplinary backgrounds. The "AI+X" interdisciplinary integration pathway should be implemented, designing differentiated teaching content for different majors—brewing engineering, marketing, and tourism management—so that teaching truly fits the learners. Moutai Institute enjoys unique conditions here by virtue of its "famous-enterprise schooling" advantage: real industrial cases, such as Moutai Group's intelligent brewing and digital marketing, can be directly introduced into courses, achieving the integration of AI general education with industrial practice. The ultimate vision is to form an educational landscape in which "general courses are embedded in majors, professional courses integrate general education, and integrated outcomes highlight distinctiveness."

5.4. Innovating a student-centered teaching model anchored in industrial contexts

Traditional teaching has obvious limitations, and AI general education in industry-specific universities needs to reform its methods to address them. The goal here is to construct a blended teaching model that is student-centered and driven by real industrial problems.

Industrial case teaching and contextual experience take the leading position. Moutai Institute's characteristic cases—intelligent brewing, baijiu anti-counterfeiting traceability, and digital marketing—can be introduced into the classroom, guiding students to weigh the pros and cons of technologies and make value judgments within specific industrial contexts, so that cognitive construction occurs naturally in the process of exploring real problems. Project-based and inquiry-based learning follow closely: students work in teams to investigate topics such as "Applications of Intelligent Technology in Sauce-Aroma Baijiu Production" and "AI Empowering the Dissemination of Liquor Culture," comprehensively employing digital skills and deepening industrial cognition through practice. Industry-education integration also opens the door to the "workshop classroom." Relying on Moutai Institute's more than 80 practice teaching bases and the dual-mentor mechanism, students can enter the production front line to observe and experience the operation of intelligent equipment and digital platforms in the brewing industry, rooting cognitive construction in vivid industrial practice. Finally, critical thinking training deserves its place: students should be encouraged to independently reflect on algorithmic recommendation, information cocoons, AI ethical dilemmas, and other issues, cultivating thinking habits that neither follow blindly nor worship technology, but are critical, exploratory, and evidence-seeking.

One point deserves special emphasis: in AI general education, the dialectical relationship between "guidance" and "restriction" needs careful handling. Students should be allowed full access to intelligent tools so that human-machine collaboration capabilities can grow, but clear usage norms should guide their rational and responsible use, so that technological dependence does not erode deep learning.

5.5. Building cross-disciplinary, cross-industry collaborative teaching faculty

Faculty quality is the decisive variable in AI general education, and the current single-structure faculty is a real constraint. Three directions merit attention: recruitment and cultivation, collaboration and sharing, and industry-education integration.

In terms of recruitment and cultivation, the university should both actively recruit composite teachers who possess both technical literacy and humanities vision, and strengthen targeted cultivation of existing teachers—through thematic research, academic workshops, and cross-

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disciplinary academic seminars—so that they can better integrate AI topics with humanities and social science perspectives and industrial scenarios. The Ministry of Education's deployed "AI-Boosted Teacher Team Building Action" [1] proposes deepening teacher digital literacy training, providing policy support for this capability enhancement. In terms of collaboration and sharing, cross-disciplinary teaching teams composed of teachers from information technology, education, sociology, ethics, and brewing engineering should be established, so that complementary strengths converge and disciplinary knowledge barriers collapse through mechanisms such as collective lesson preparation, collaborative teaching, and joint teaching research. In terms of industry-education integration, Moutai Institute's "full-time teacher + industry mentor" dual-mentor mechanism is a genuine asset: industry mentors who possess both technical backgrounds and industrial experience can deeply participate in AI general education teaching, bringing cutting-edge intelligent application practices into the classroom, providing students with diverse cognitive perspectives, and alleviating the dual difficulties of insufficient professional faculty and course content lagging behind industrial development.

5.6. Refining a scientific, diversified, and industry-oriented evaluation mechanism

Any AI general education reform will struggle to endure if evaluation does not keep pace. In industry-specific universities, a scientific evaluation mechanism is key to making overall reform effective. It is necessary to break the single paper-based examination model and replace it with a diversified system that combines process evaluation with summative evaluation, knowledge evaluation with literacy evaluation, while granting industrial application capability its due weight.

In terms of content, in addition to examining foundational AI knowledge, special attention should be paid to students' digital ethics, information discrimination, critical thinking, industrial intelligent application capability, and the transformation of cognitive construction—measured through diverse forms such as industrial case analysis, project outcomes, research reports, and growth portfolios. In terms of subjects, the diversified combination should bring together student self-assessment, peer assessment, teacher evaluation, and industry mentor evaluation to enhance the comprehensiveness and objectivity of evaluation. In terms of orientation, developmental evaluation should be emphasized, focusing on students' growth trajectories in digital literacy and cognitive construction. Against the backdrop of increasingly common AI-assisted learning, the focus of evaluation should shift from the surface quality of end products toward question formulation, evidence selection, reasoning processes, and responsibility articulation—so that tool capabilities cannot mask students' genuine growth. Through evaluation feedback, teaching can be continuously improved, and the virtuous cycle of "evaluation promoting teaching, evaluation promoting learning" can be sustained.

6. Conclusion

The AI era presents both rare opportunities and unavoidable talent-cultivation challenges to industry-specific universities. Integrating AI general education into students' digital literacy and cognitive construction is, on the one hand, an inevitable response to the talent demands of the intelligent era, and on the other hand, the inherent requirement of such institutions to serve industrial transformation and upgrading, return to the essence of education, and promote the all-round development of human beings. After clarifying the internal logic of the three elements, this paper analyzed the practical challenges facing AI general education in industry-specific universities, proposed the "technological empowerment–value guidance–cognitive construction" trinity integration framework using Moutai Institute as an example, and outlined implementation pathways

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from the four dimensions of curriculum system, teaching model, faculty development, and evaluation mechanism.

It should be candidly acknowledged that the integration of AI general education with digital literacy and cognitive construction in industry-specific universities is a dynamically evolving systemic project. Its theoretical construction and practical exploration still require deepening, and this paper, as a theoretical exploration, awaits validation and support from subsequent empirical research. Future work points in three directions. First, conducting empirical surveys based on large-sample questionnaires and interviews to quantitatively assess the effects of AI general education on digital literacy and cognitive construction of students in industry-specific universities. Second, exploring differentiated implementation pathways for universities with different industrial attributes—energy, transportation, agriculture and forestry, and brewing. Third, establishing long-term tracking mechanisms to examine how the effectiveness of AI general education manifests over time in industrial employment and industrial participation.

Looking ahead, industry-specific universities should, based on their own industrial positioning and students' realities, continuously optimize the content supply, methodological innovation, and safeguard mechanisms of AI general education. As Professor Wang Yang has observed [5], education in the intelligent era must adhere to human development as its orientation—"technology cannot replace thinking, algorithms cannot replace judgment, and efficiency cannot replace value." Only through the organic unity of knowledge transmission, capability training, and value shaping can we cultivate high-quality application-oriented talents who possess digital literacy, industrial cognition, and social responsibility, enabling them to participate rationally in the construction of the intelligent era—thereby providing a solid talent foundation for high-quality industrial development and social progress in the age of artificial intelligence.

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