

Research on the Underlying Logic of Innovation and Entrepreneurship Education in Higher Education Institutions in the Digital Age: Transformation and Paradigm Innovation

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Abstract: *The wave of digital intelligence technology, especially the breakthrough development of generative artificial intelligence, is reshaping the innovation paradigm and entrepreneurial ecosystem with unprecedented force. Higher education institutions' innovation and entrepreneurship education is facing both global challenges and historical opportunities, ranging from "educational concepts" to "practical models". This paper aims to go beyond the shallow application perspective of "tool theory" and deeply analyze the deconstruction and reconstruction of the underlying logic of innovation and entrepreneurship education in higher education institutions in the digital intelligence era. It specifically elaborates on this from four dimensions: knowledge view, learning view, teacher-student view, and value view. The research suggests that the educational logic is undergoing fundamental changes, from "static knowledge transmission" to "dynamic knowledge creation", from "planning-execution" to "creation-iteration", from "teacher-led" to "human-machine collaboration", and from "instrumental rationality" to "meaning construction". On this basis, this paper constructs a new paradigm of "AI-enabled personalized generative learning" and proposes specific practical approaches around the curriculum system, teaching mode, evaluation mechanism, and teacher support to provide theoretical guidance and practical framework for the deepening reform and paradigm transformation of innovation and entrepreneurship education in higher education institutions in the new era.*

Keywords: Digital intelligence era; Innovation and entrepreneurship education; Underlying logic; Paradigm innovation; Generative artificial intelligence; Education modernization

1. Introduction: Era Transformation and Educational Dilemma

The "15th Five-Year Plan" period is a crucial five years for China as it embarks on a new journey towards building a modern socialist country in all respects. The core position of innovation in the overall modernization drive of our country is becoming increasingly prominent. As an important component of the national innovation system and the main battlefield for talent cultivation, the quality of innovation and entrepreneurship education in universities directly affects the effectiveness of the national innovation-driven development strategy.

At the same time, we are in a grand era of digital intelligence. Disruptive technologies such as generative artificial intelligence, big data, and the metaverse not only give birth to new industries, business forms, and models, but also profoundly change the inherent laws of innovation: the innovation cycle is sharply shortened, disciplinary boundaries are increasingly blurred, data-driven methods become the core approach, and human-machine collaboration becomes the norm. These changes have plunged the traditional innovation and entrepreneurship education model based on industrial era thinking into a predicament of insufficient adaptability: meticulously crafted business plans may become outdated before market validation; classic case analyses are hard-pressed to cope with the rapidly changing real business environment; and the closed, linear "learn first, then do"

model fails to cultivate innovative talents capable of handling uncertainties.

Facing this fundamental challenge, the current reforms in innovation and entrepreneurship education in universities mostly remain at the "technique" level, such as introducing online courses, using teaching software, and holding AI-based competitions. Although these measures have achieved certain results, they have not touched upon the "principle" of education - its underlying logic and core paradigm. Without profound reflection and systematic reconstruction at the philosophical level, any technical fixes will be superficial. Therefore, the core question this study aims to answer is: What underlying logics of innovation and entrepreneurship education in universities have been deconstructed by the digital intelligence era? And how should a new educational paradigm be constructed to adapt to it? Exploring this question is not only an inevitable requirement to respond to national strategic demands but also an intrinsic need for the modernization transformation of innovation and entrepreneurship education itself.

2. Transformation of the Underlying Logic: From "Teaching a Man to Fish" to "Empowering a Man with Wisdom"

The underlying logic of education constitutes the philosophical cornerstone of educational practice. Digital intelligence technology is driving four-dimensional

fundamental transformations in university entrepreneurship and innovation education.

2.1 Knowledge Perspective: From Static Knowledge Transmission to Dynamic Knowledge Co-creation

Traditional entrepreneurship and innovation education adheres to a "static knowledge perspective," whose core mission is to systematically impart verified, structured business knowledge to students—such as Porter's Five Forces Model, SWOT analysis, and financial management principles. This perspective treats knowledge as a packable, transferable, and storable object. However, in the digital intelligence era, the half-life of knowledge has shortened drastically. Tools like AIGC (Artificial Intelligence Generated Content) can instantly generate, integrate, and deduce massive information, leading to a significant decline in the market or exclusive value of knowledge. This is because the marginal cost of knowledge production and content creation continues to decrease, weakening the traditional profit model that relies on exclusive control and scarcity.

The new era calls for a "dynamic knowledge co-creation" perspective, whose core argument is that knowledge is no longer a static stock but a "flow" continuously generated through sustained interactions between humans, intelligent tools, peers, and the environment in specific contexts. AIGC has evolved from a simple information retrieval tool to a powerful "cognitive partner," capable of engaging in in-depth dialogues with learners to stimulate new ideas and connections beyond individual cognitive limitations. For example, students can use AIGC to simulate user interviews across cultural contexts, synthesize cutting-edge technical reports rapidly, or generate multiple divergent drafts of business model canvases. In this process, the core goal of learning shifts from "memorizing knowledge" to the ability to "pose questions," "harness tools," and "co-create new knowledge." Connectivism learning theory provides robust support: it posits that learning is a process of forming connections between specialized nodes and information sources, and AIGC precisely serves as a highly abundant and accessible connection node, greatly expanding the breadth and depth of individual knowledge networks.

2.2 Learning Perspective: From "Plan-Execution" to "Co-creation-Iteration"

Aligned with the static knowledge perspective is the "plan-execution" learning model, a linear approach emphasizing meticulous pre-action planning and comprehensive learning to pursue plan perfection and execution certainty. Its typical output is a detailed, logically consistent business plan.

The uncertainty of the digital intelligence era demands a shift to a "co-creation-iteration" learning perspective. This model emphasizes learning through bold hypothesis formulation, rapid prototyping, data-driven validation, and agile reflection-adjustment in ambiguous and uncertain environments. It aligns closely with effectuation theory, which argues that entrepreneurs should focus on existing means (who I am, who I know, what I know) to proactively shape possible futures rather than overpredicting the unknowable. Digital intelligence tools have drastically reduced the cost and

threshold of "co-creation" and "iteration": no-code/low-code platforms enable students to build usable application prototypes within hours; AIGC can generate product designs, marketing copy, or even virtual Minimum Viable Products (MVPs) rapidly; data analysis tools provide real-time user behavior feedback. This allows the "build-measure-learn" lean startup cycle to operate at unprecedented speed and frequency in classrooms and laboratories. Learning outcomes are no longer static plans but evolving "living" project prototypes, real data feedback records, and insightful reflective journals of the entrepreneurial journey.

2.3 Teacher-Student Perspective: From Teacher-Centered to Human-Machine Collaboration

In traditional models, teachers are authoritative knowledge holders and primary skill transmitters, occupying the central position in teaching, while students are passive knowledge recipients—a typical "transmission-reception" relationship.

Digital intelligence technology has completely restructured the teaching community, forming a new "human-machine collaboration, teacher-student co-creation" perspective. In this framework:

AI acts as a powerful "collaborator" and "capacity multiplier", undertaking knowledge integration, prototype generation, data analysis, and partial personalized tutoring.

Students transform from passive recipients to active "explorers" and "constructors," serving as the core of the learning process—defining problems, harnessing AI tools, making decisions, and bearing consequences.

Teachers must transition from authoritative roles to "learning facilitators," whose core responsibilities shift from information transmission to designing challenging learning contexts, stimulating intrinsic motivation, guiding in-depth thinking in human-machine collaboration, and fostering critical thinking, ethical awareness, and social responsibility. This requires teachers to possess high AI literacy, enabling them to skillfully use and critically evaluate intelligent tools to fulfill their new role as "learning designers."

2.4 Value Perspective: From Instrumental Rationality to Meaning Construction

Long-term, university entrepreneurship education has been influenced by "instrumental rationality," tending to use commercial metrics (e.g., financing amount, enterprise valuation, return on investment) as primary criteria for evaluating educational effectiveness and student achievement. This necessitates profound reflection and holistic elevation of its value orientation—from singular "instrumental rationality" to diverse, humanistic "meaning construction" and "responsibility assumption."

The new educational philosophy must integrate technological ethics, sustainable development, and social welfare into core content, guiding students to reflect on fundamental questions such as "why innovate" and "for whom to entrepreneurship." In teaching and project practice, emphasis should be placed on evaluating the social impact of technology, strengthening Environmental, Social, and Governance (ESG) principles, and encouraging students to use intelligent technology to address major social issues (e.g.,

climate change, healthcare, educational equity), thereby cultivating their sense of national identity and global responsibility as innovative talents of the new era.

3. Paradigm Innovation: Constructing an "Intelligence-Driven Personalized Generative Learning Model"

Driven by the transformation of underlying logic, university entrepreneurship education urgently requires a profound paradigm shift. We propose an "Intelligence-Driven Personalized Generative Learning Model" with three interrelated core features.

3.1 Intelligence-Driven: Full-Process Capacity Enhancement

Intelligent technology is deeply integrated into every stage of the "idea-concept-prototype-validation" cycle, serving as a backbone for learning and practice. In the idea phase, cross-domain/cross-disciplinary thinking is stimulated via intelligent tools to generate diverse innovative insights. In market-user understanding, data analytics and emotion recognition technologies rapidly map user portraits and market landscapes. In product development, visual development tools and modeling platforms convert ideas into experiential, verifiable preliminary outcomes. During learning, intelligent systems provide personalized resources, Q&A, and feedback based on student progress and needs.

3.2 Personalization: Learning Path Design Based on Competency Portraits

Leveraging learning analytics and intelligent assessment, a dynamically updated "competency portrait" is established for each student to identify their knowledge structure, skill characteristics, thinking patterns, and interest orientations. The education system then matches students or teams with tailored learning content, practical tasks, and guidance resources, realizing true individualized teaching and breaking the homogenization constraints of traditional education.

3.3 Generative: Evolvable Projects as Carriers

The core output of the model is "generative." The entire teaching process revolves around project initiation, exploration, trial-and-error, and refinement. Learning evaluation focuses on two key dimensions: the growth potential of projects after effective iterations, and students' demonstration of comprehensive literacy, collaborative skills, data awareness, and value judgment during exploration. This reflects the organic integration and advancement of design thinking and systems thinking in intelligent environments.

4. Practical Pathways and Institutional Guarantees

Translating the theoretical paradigm into educational practice requires systematic reforms and robust institutional support.

4.1 Curriculum Restructuring: Building a "T-shaped" Knowledge Structure

The new curriculum aims to cultivate a "T-shaped" knowledge structure: Vertical depth ("T's vertical stroke"): Solid professional fundamentals and cutting-edge digital skills (e.g., data analytics, AI tool application, computational thinking). Horizontal breadth ("T's horizontal stroke"): New courses such as AI Ethics and Entrepreneurship, Sustainable Development and Business for Good, and Cross-Cultural Innovation Leadership to broaden students' tech-humanities literacy and cross-domain integration capabilities. All professional courses should integrate digital intelligence elements to achieve "intelligence+" transformation.

4.2 Teaching Model Reform: Promoting Challenge-Based Learning

Vigorously advance project- and challenge-based learning. Starting from real, complex industry/societal problems (e.g., "How to use AI to advance rural revitalization," "Designing a carbon-neutral community business model"), interdisciplinary student teams conduct weeks/months of in-depth exploration and solution design with AI assistance. This model naturally integrates the "co-creation-iteration" learning perspective and "human-machine collaboration" teacher-student relationship.

4.3 Evaluation Mechanism Reform: From Assessing Answers to Evaluating Processes

Establish a multi-dimensional, process-oriented evaluation system matching the generative paradigm: Reduce the weight of final written exams; increase the proportion of project iterations, AIGC prompt engineering quality, data analysis reports, team collaboration records, final project defenses, and reflective summaries. Involve multi-stakeholder evaluators: teachers, peers, industry mentors, and AI-assisted evaluation systems. Focus on key competencies: decision-making under uncertainty, learning from failure, human-AI collaboration efficiency, and social value consideration.

4.4 Faculty Development and Institutional Innovation

AI Literacy Enhancement Initiative: Through specialized training, workshops, and industry-university joint laboratories, comprehensively improve entrepreneurship mentors' ability to use and critically evaluate AI tools; support interdisciplinary teaching teams of teachers and AI engineers.

Teacher Evaluation and Incentive Reform: Treat achievements in new-paradigm course development, project guidance, and teaching innovation as key criteria for title promotion, position appointment, and performance rewards to stimulate intrinsic motivation for reform.

Smart Maker Space Construction: Break physical-virtual boundaries to build an integrated practice platform with high-performance computing resources, professional AI software, rapid prototyping equipment, and collaborative office areas, providing material support for the new paradigm.

5. Conclusion and Future Research

The digital intelligence era does not merely provide novel tools for university entrepreneurship education but

profoundly challenges its philosophical foundation, calling for comprehensive reconstruction from underlying logic to practical paradigm. This paper systematically demonstrates four core transformations—from static knowledge to dynamic co-creation, plan-execution to co-creation-iteration, teacher-centered to human-machine collaboration, and instrumental rationality to meaning construction—and constructs a theoretical framework of the "AI-empowered personalized generative learning paradigm."

This transformation requires university entrepreneurship education to upgrade its historical mission: from cultivating job seekers who can write business plans to shaping "future change makers" who can navigate uncertainty, excel in human-machine collaboration, and uphold "technology for good." While this path is fraught with challenges (demanding systematic reshaping of curricula, teaching, evaluation, and faculty), it also presents a historic opportunity for Chinese higher education. Only by embracing self-revolution and proactive change can university entrepreneurship education fulfill its core mission of nurturing top-tier innovative talents for national modernization during the 15th Five-Year Plan and beyond, contributing irreplaceable educational strength to Chinese-style modernization.

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