Exploring the Pathways and Practical Analysis of Digital-Intelligent Transformation in Application-Oriented Higher Education: A Case Study of the "Technology-Discipline-Application" Integration Model at Qingdao Hengxing University of Science and Technology

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ABSTRACT

Faced with the wave of digital-intelligent transformation in education, how application-oriented universities can break through the disconnection between "technological instrumentalization" and "traditional teaching" has become a key issue in educational reform. This study takes Qingdao Hengxing University of Science and Technology as a typical case, proposing and validating a "Technology-Discipline-Application" three-dimensional integration model driven by "authentic application." This model establishes a digital foundation through building the "Hengxing Capacity Platform + high-end experimental centers" (Technology), restructures the curriculum system around "project-based and studio-based approaches" (Discipline), and embeds real-world commercial projects such as "brand operations, film and television production, and live-streaming e-commerce" (Application), thereby achieving deep integration of industry and education. The study finds that using "authentic application" as a value anchor can reversely reconstruct the teaching system and organizational model; the dual-base architecture of "platform + scenarios" effectively promotes the synergistic empowerment of technology, knowledge, and ability; and the educational ecology of "teachers as mentors, students as creators, and works as products" significantly enhances the quality and adaptability of talent cultivation. This research provides replicable practical pathways and theoretical insights for resolving the structural contradictions in the digital-intelligent transformation of application-oriented universities.

Keywords: Digital-Intelligent Transformation in Education; Application-Oriented Universities; Industry-Education Integration; Qingdao Hengxing University of Science and Technology

INTRODUCTION

In recent years, the rapid development of intelligent technologies such as artificial intelligence, big data, and cloud computing has profoundly reshaped global society and industrial landscapes. As a critical domain for technological application, the field of education is undergoing a transformation from "informatization" to "digital-intelligent integration." Particularly within the higher education system, the Chinese government has introduced policy documents such as the Digital Education Strategic Action and the Digital Campus Construction Standards for Higher Education Institutions (Trial), explicitly urging application-oriented universities to deepen industry-education integration and promote educational model innovation, aiming to cultivate versatile and innovative talents who can meet the demands of emerging industries and the digital economy. Under this strategic guidance, the value of digital-intelligent education is no longer limited to the enhancement of "technological empowerment" or "teaching tools" but is advancing toward a deeper stage of "system reconstruction" and "model transformation."

However, in practice, application-oriented universities still face numerous challenges and contradictions in promoting digital-intelligent transformation. On the one hand, institutions have generally invested substantial resources in constructing digital teaching platforms and high-end experimental training equipment. Yet, due to the lack of effective curriculum system integration and practical teaching mechanisms, issues such as "underutilized advanced equipment" and "low resource efficiency" frequently occur. On the other hand, outdated teaching philosophies and faculty structures, coupled with the dominance of traditional classroom models, create a stark contrast between "significant

technological investment" and "weak teaching outcomes." This structural contradiction not only undermines the effectiveness of digital-intelligent education but also restricts the social contribution of application-oriented universities in cultivating high-quality technical and skilled talents.

Therefore, this study aims to address a key question: How can we construct an application-oriented path for digital-intelligent transformation in education that genuinely empowers teaching and talent cultivation?

THEORETICAL FRAMEWORK

The research logic of this paper unfolds systematically through three progressively advancing components. The primary component constitutes the cornerstone and core of this theoretical framework, dedicated to conducting an in-depth academic analysis of the profound connotations and value orientations of digital-intelligent transformation in education, while simultaneously precisely capturing the distinctive characteristics of application-oriented universities in aspects such as their institutional positioning, talent cultivation models, and social service functions. Through this cross-analysis, this study will systematically trace and elucidate the structural roots of various practical challenges encountered by application-oriented universities in promoting digital-intelligent transformation, thereby laying a solid theoretical foundation for subsequent case analysis and pathway development.

METHOD

This study takes the School of Art and Media at Qingdao Hengxing University of Science and Technology as the research subject, exploring its exploratory practices and experiential insights in the context of digital-intelligent education. The typicality of its model lies in the fact that it does not merely pursue "technological advancement" but instead, based on the institution's positioning and regional industrial needs, explores an educational innovation path that integrates "technology—discipline—application" through real commercial projects and industrial applications.

Secondly, through a case analysis of the "technology—discipline—application" integration model at Qingdao Hengxing University of Science and Technology, this study summarizes its key practices in teaching innovation, resource integration, and industry-education collaboration.

FINDINGS AND DISCUSSION

The Transformation Background of Educational Digital-Intelligence and the Dilemmas of Application-Oriented Universities

1. The Era Characteristics and Strategic Direction of Educational Digital-Intelligence

Entering the third decade of the 21st century, the integrated development of technologies such as artificial intelligence, big data, the Internet of Things, cloud computing, and virtual reality has driven profound changes in industrial structures and social forms worldwide. The field of education, as a core link in knowledge production and talent cultivation, is undergoing a historic leap from "informatization" to "digital-intelligence." So-called "educational digital-intelligence" not only signifies the use and reliance on digital technology in educational activities but, more importantly, emphasizes the deep integration of technology and educational logic. This involves driving the structural reconstruction of the education system, the paradigm shift in teaching methods, and the systematic optimization of governance models through intelligent technology. Its essence lies in reshaping the production relationships and value systems of education based on data intelligence, thereby achieving overall improvement in education quality, efficiency, and equity.

At the level of national strategy, from the Education Informatization 2.0 Action Plan1 and the Digital Education Strategic Action2 to the ongoing promotion of the "Smart Education Demonstration Zone Construction Project,"3 China's educational digital-intelligence has progressed from the "tool application stage" to the "model innovation and system reconstruction stage." From the national to local levels, efforts are centered around researching and deploying high-quality education development action plans related to artificial intelligence. Implementing these plans relies not only on educational infrastructure, data resources, and the digital-intelligence literacy of teachers and students but also on the maturity of large models and intelligent agents, as well as addressing issues of security and ethics.

[1] http://www.moe.gov.cn/srcsite/A16/s3342/201804/t20180425_334188.html
[2] http://www.moe.gov.cn/jyb_xwfb/gzdt_gzdt/moe_1485/202503/t20250328_1185222.html
[3] http://www.moe.gov.cn/srcsite/A16/s3342/202104/t20210401_523802.html

4The Ministry of Education has explicitly stated the goal to fully establish a digital education system serving lifelong learning for all by 2035. The core objective is to promote the digitalization of educational elements, the intellectualization of teaching processes, the precision of governance systems, and the personalization of learning methods. For higher education, this strategic direction signifies not merely a technological upgrade but a holistic transformation of educational philosophy, organizational structure, and talent cultivation models.

From a macro perspective, educational digital-intelligent transformation demonstrates remarkable advantages in three key aspects: a technology-driven intelligent learning ecosystem, an open platform system for resource sharing, and a learner-centered personalized learning model.

Firstly, within the technology-driven intelligent learning ecosystem, education is transitioning from being "experience-oriented" to "algorithm-oriented" through data analysis, knowledge graphs, and AI-assisted teaching, thereby endowing pedagogical decision-making with greater scientific rigor and adaptability. Secondly, the open platform system for resource sharing, supported by digital infrastructure construction and the cloud-based migration of educational resources, is shifting education from a closed campus-based system towards a collaborative framework that transcends individual institutions, regions, and sectors. Finally, in constructing the learner-centered model, the core focus of digital-intelligent education is no longer "what to teach" but "how to learn"; it shifts away from a "teacher-centered" approach to a "learner-centered" one, emphasizing the autonomy and suitability of learning pathways.

However, this transformation imposes higher demands on higher education institutions. Educational digital-intelligent transformation requires not only the integration of technology but, more importantly, the restructuring of disciplinary systems and the embedding of application scenarios. Particularly for universities aimed at cultivating application-oriented talents, the fundamental challenge lies not in technological inadequacy, but in how to genuinely make technology an internal driving force for "educational innovation," thereby achieving synergistic progress in teaching, research, and industry.

2. The Functional Positioning and Transformation Pressure of Application-Oriented Universities

Application-oriented universities constitute a vital component of China's higher education system, bearing the mission of supplying technical-skilled, innovative, and interdisciplinary talents for regional economic development and emerging industries. Their core characteristics are: a social demand-oriented approach, a focus on practical application, an emphasis on the integration of theory and practice, and a stress on the economic and social value of educational services. With the advancement of national initiatives such as "Emerging Engineering," "New Liberal Arts," and "New Arts," application-oriented universities have become a significant force driving the upgrading of local industrial structures and the development of regional innovation ecosystems.

However, against the backdrop of the digital-intelligent transformation in education, these universities face dual pressures. Externally, the rapid iteration of industries and the digital transformation of businesses urgently demand that graduates possess higher-level digital literacy, adaptive learning capabilities, and complex problem-solving skills. Internally, issues such as the slow updating of curricula, a shortage of faculty with both practical experience and digital competency, and a disconnect between traditional training models and actual industrial needs have become increasingly prominent. This necessitates that application-oriented universities must not only keep pace with technological trends but, more crucially, achieve deep integration across the dimensions of "technology-education-industry," reshaping their educational models to enhance their relevance and contribution to societal development.

Application-oriented universities must transform genuine industrial pain points into the core driving force for community building.5 However, these institutions face particularly acute pressures during the educational digital-intelligent transformation. Certain constraints exist in the relationship between institutional resources and technological foundations. Compared with research universities, application-oriented universities generally lag in financial investment, digital infrastructure, and technological research and development capabilities. Although some have established digital laboratories, smart classrooms, and virtual simulation centers, these facilities often remain at the "demonstration level,"

[4] Shen, Shusheng. "From Paradigm Shift to Pattern Innovation: The Changing and Unchanging in Digital-Intelligence Empowered Education." Journal of Educational Development, vol. 45, no. Z2, 2025.

[5] Dong, F. (2025). Research on the Practical Path of Learning Communities in Application-Oriented Universities under the Smart Teaching Model. Knowledge Economy, (30).

lacking systematic curriculum integration and data-driven mechanisms. This results in low utilization rates of technological resources and fails to generate sustained momentum for teaching innovation.

Regarding the development of the teaching faculty, a practical issue exists in the form of insufficient composite capabilities. Most teachers in application-oriented universities come from either disciplinary education backgrounds or professional practice fields, creating gaps in their specialized technical skills, digital teaching abilities, and cross-disciplinary integrative thinking. Within the educational environment of the university, while teachers are increasingly using technology and are influenced by concepts such as "using technology to create value" and "using digital means to represent facts," they are prone to a cognitive bias that equates "technology empowerment" with "technology dependence" or "technology blind adherence."6 Educational digital-intelligent transformation requires teachers to possess data literacy, system design capabilities, and industrial understanding, yet the current teacher training system has not fully adapted to this demand. Although many teachers can operate digital tools, they often fail to integrate technology into the pedagogical logic, leading to a phenomenon of "technology performativity."

Furthermore, application-oriented universities also face the current situation of a low alignment between educational objectives and industrial needs. Judging by the educational goals different universities benchmark against, the talent cultivation objectives of application-oriented universities should inherently align with industrial structures and job requirements. However, in reality, the curriculum system is disconnected from the industrial forefront, and the updating of teaching content lags behind. Application-oriented talents are skilled practitioners who apply professional knowledge and technical theory to actual work, daily life, and production. The core is to apply theoretically acquired knowledge to work practice, solving real-world problems and creating value for enterprises.7 With the intelligent development of industries, the demand for interdisciplinary and innovative talents is growing, yet the students cultivated by universities often remain at the level of "tool mastery," lacking systemic thinking and practical project experience. This misalignment further exacerbates the tension between university education and societal needs.

Therefore, the digital-intelligent transformation of application-oriented universities is not merely a matter of technological upgrading but a systematic project involving the reshaping of educational functions and institutional innovation. Only by breaking down the barriers between technology, disciplines, and industry under the premise of an "application-orientation" can the transition from "digital teaching" to "digital-intelligent education" be truly achieved.

3. The Structural Contradiction Between "Technological Instrumentalization" and "Traditional Teaching"

Although investment in digitalization within China's higher education sector has significantly increased in recent years, many application-oriented universities still find their digital-intelligent reform trapped in a dilemma between "technological instrumentalization" and "traditional teaching." On one hand, digital construction is often narrowly understood as "hardware upgrades" and "platform procurement," neglecting the profound transformation of teaching philosophies, content, and organizational methods. On the other hand, traditional teaching models centered on the teacher and the curriculum continue to dominate, leading to a misalignment between technological innovation and pedagogical renewal, thereby creating a structural disconnect. This is primarily manifested in the following three aspects:

First, there is a coexistence of "idle high-end equipment" and "outdated teaching methods." Many universities have invested heavily in building smart classrooms, simulation laboratories, and digital platforms. However, in the absence of systematic instructional design, these facilities often become mere "showpieces." Teachers continue to employ traditional lecturing methods, lacking project-based and contextualized teaching innovations. Students, in turn, passively receive knowledge without utilizing these platforms to foster capability development and knowledge transfer. Technology becomes an "external ornament" rather than a driver of teaching and learning.

[6] Zhao, X., & Shen, S. (2025). From Integrating Technology in Teaching to Creating Technology for Education: The Endogenous Logic and Enhancement Path of Teachers' "Technological Consciousness" in the Digital-Intelligent Era. China Educational Technology, (10).

[7] Zhang, P., Cheng, Y., Yang, H., & Cui, S. (2025). Research on the Construction of Career Education Curriculum System in Application-Oriented Universities from the Perspective of School-Enterprise Collaborative Education. Technology Wind, (29).

Second, a stark contrast exists between "substantial technological investment" and "weak outcomes." The core of educational digital-intelligent transformation lies in enhancing teaching quality and the effectiveness of talent cultivation. However, the transformation practices in some institutions exhibit a tendency to "prioritize construction over application" and "emphasize platforms over content." Due to the lack of data analysis and teaching feedback mechanisms, platform operation remains disconnected from teaching quality assessment, resulting in a disproportionate relationship between input and output. Consequently, the digital-intelligent transformation fails to form an endogenous driving mechanism and instead increases management and maintenance burdens.

Third, there is a misalignment between "technological advancement" and "educational logic." The fundamental purpose of introducing digital-intelligent technology is to optimize and reconstruct the educational process. Yet, in practice, technology application often deviates from educational objectives and student development needs. Some course designs excessively focus on the novelty of technical forms while ignoring the depth of knowledge and the construction of learning logic. This not only fails to enhance the learning experience but may also lead to the fragmentation and superficiality of knowledge, hindering the development of students' critical thinking and innovative abilities.

Finally, there is the misalignment between "technological logic" and "educational logic." The essence of education lies in the cultivation of people, not in the display of technology. In the context of digital-intelligence, teaching evaluation technologies such as intelligent profiling, machine scoring, data analysis, and AI-assisted evaluation are emerging one after another, playing an important role in empowering the transformation of educational assessment.8 However, many universities, in promoting digital-intelligent transformation, unilaterally emphasize technical parameters and system functions while neglecting the cognitive rules, emotional needs, and the value of social learning inherent in the educational process. This results in the superficial application of technology and the hollowing out of educational substance, creating a situation of "superficial innovation but substantive stagnation." This misalignment leads educational digital-intelligent transformation into the of "technological supremacy," undermining the fundamental educational purpose of teaching.

The root cause of this structural contradiction lies in the lack of an effective mediating mechanism between "technology input" and "pedagogical transformation" within the education system. The logic of technological systems is efficiency and standardization, whereas the logic of educational systems is personalization and generativity. The integration of the two requires "application" as a bridge, driven by authentic scenarios, to genuinely embed technology into the entire process of teaching and learning. The key to resolving this contradiction, therefore, lies in a shift in mindset: from a "technology-centric" to an "application-oriented" approach; from "resource construction" to "capacity generation"; and from "tool application" to "model reshaping." This is precisely the value of the "Technology-Discipline-Application" three-dimensional integration model adopted by the College of Arts and Media at Qingdao Hengxing University of Science and Technology—it uses real commercial projects as an anchor point to achieve deep coupling of digital-intelligent technologies, disciplinary knowledge, and industrial application, providing a practical pathway and paradigm reference for the digital-intelligent transformation of application-oriented universities.

[8] Qiao, Y. (2025). The Endogenous Motivation, Key Issues, and Practical Directions of Digital-Intelligence Technology Empowering the Transformation of Educational Evaluation. Teaching and Administration, (24).

Figure 1. Digital Art Experimental Teaching Demonstration Center Platform

Figure 2. Converged Media Command Center

The Construction Logic of the "Technology-Discipline-Application" Integration Model

The value of educational digital-intelligent transformation lies not in the speed of technological updates, but in how technology promotes the regeneration of educational structures and the reshaping of their functions. The core mission of application-oriented universities is to achieve the educational goal of "applying learning to practice" through educational innovation. Based on this, the College of Arts and Media at Qingdao Hengxing University of Science and Technology has proposed and implemented the "Technology-Discipline-Application" three-dimensional integration model in its digital-intelligent transformation. This model is driven by "authentic application," supported at its foundation by digital-intelligent technology, with the discipline system serving as the knowledge intermediary. Through real-world projects, it achieves multidimensional linkage between teaching, research, and industry, forming a new educational ecosystem aimed at "capacity generation."

1. The "Authentic Application"-Oriented Philosophy of Educational Digital-Intelligence

Within the context of educational digital-intelligent transformation, traditional "instrumental rationality" can no longer support the sustainable development of educational innovation. Only by placing digital-intelligent technology within "authentic application scenarios" can its true educational effectiveness be realized. Against the backdrop of developing new quality productive forces, talent cultivation urgently needs to break through the constraints of traditional disciplinary boundaries. Universities should promote the integrated development of basic disciplines, emerging disciplines, and

interdisciplinary studies.9 The so-called "authentic application-orientation" does not merely involve simulating professional scenarios or adding practical training components. Rather, it takes genuine societal needs, industrial problems, and commercial tasks as the starting point of education. Through project-based learning and scenario-based teaching, it enables students to achieve competency transfer and knowledge construction in the process of "problem-solving."

The digital-intelligence philosophy of Qingdao Hengxing University of Science and Technology is precisely built upon this "application-driven" educational logic. Its core concepts can be summarized in three points:

a. Transitioning from "Knowledge Transmission" to "Capability Generation"

In traditional teaching, the goal of education is for students to master established knowledge; whereas in digital-intelligent education, the core objective is to enable students to autonomously generate knowledge in open environments and translate it into practical problem-solving abilities. By integrating technological platforms with real-world projects, the student learning process becomes a dynamic journey of "learning by doing."

b. Shifting from "Teaching-Centric" to "Application-Centric"

Teaching activities no longer revolve solely around the classroom but are guided by industrial challenges and societal needs. Teachers are no longer mere knowledge transmitters but serve as project mentors and research guides; students are no longer passive recipients but become project collaborators and creative practitioners. This role transformation fosters a learning community driven by authentic tasks.

c. Evolving from "Tool Empowerment" to "Ecological Symbiosis"

The ultimate goal of educational digital-intelligence is not to replace teaching with technology but to foster a symbiotic ecosystem among "technology, teachers, students, and industry." Technological platforms become the "infrastructure" of education, yet their true value lies in providing actionable scenarios for disciplinary content and offering scalable systemic support for applied practice, thereby enabling the continuous evolution and iterative optimization of educational activities.

2. The System Architecture and Logical Mechanism of the Three-Dimensional Integration

The core of the "Technology-Discipline-Application" three-dimensional integration model lies in bridging the triple logic of the "tool layer - knowledge layer - practice layer" within educational activities, achieving a dynamic cycle of technology empowerment, knowledge transformation, and capability generation. Technology empowerment makes the educational process quantifiable and traceable; disciplinary drive ensures the scientific nature of the educational logic and knowledge system; application feedback provides the impetus for practical verification and reverse optimization. The closed-loop interaction among these three elements constitutes the systemic ecological architecture of educational digital-intelligent transformation.

Specifically, the technology layer forms the foundation of educational digital-intelligence. Confronted with the development of digital technologies and intelligent applications, key issues hindering the reform of vocational education teaching include the disunity of knowledge and action among subjects under digital technology embedding, the misalignment of virtual and real roles amid the popularization of digital-intelligent applications, and the imbalance in ecological governance within the construction of digital fields.10 Qingdao Hengxing University of Science and Technology has established a digital foundation through the "Hengxing Capacity Platform + high-end experimental centers," achieving full-process online and intelligent teaching, management, and evaluation. The platform's functions include course management, learning data tracking, work display, and teaching feedback modules, providing teachers with course design tools and offering students a multi-dimensional learning space. The experimental centers comprise facilities such as a 4K ultra-high-definition studio, a digital special effects laboratory, and a new media e-commerce live streaming laboratory. These provide authentic technological scenarios for disciplinary teaching, seamlessly connecting classroom instruction with industrial practice. The technology layer not only supplies the

[9] Lu Yanjiao, Liang Ze. The Value, Challenges, and Pathways of Integrating Digital-Intelligent Technology into Innovation and Entrepreneurship Education in Universities under the Background of New Quality Productivity. Educational Theory and Practice. 2025, 45(30)

[10] Li Wenwen, Feng Rui. Research on the Realistic Dilemmas and Solutions of Digital-Intelligence Integration Empowering the Reform of Vocational Education Classroom Teaching—Based on the TOE Theoretical Framework. Chinese Vocational and Technical Education. 2025(17)

hardware and software environment but also fulfills the functions of data accumulation and intelligent analysis, making the educational process visible, outcomes quantifiable, and improvements traceable.

The discipline layer is the core of the educational digital-intelligent transformation.** The college has redesigned its curriculum system based on a project-based and studio system, forming an interdisciplinary and cross-domain knowledge integration structure. Through project-based teaching, knowledge units are integrated into "task chains"; through the studio mechanism, a teacher-student-enterprise community is established, promoting the transformation of disciplinary content into application scenarios; and through a data-driven course evaluation system, the dynamic optimization of teaching content is achieved. The core logic of this layer is "**using projects to drive curricula, using curricula to cultivate capabilities, and using capabilities to feedback into the discipline."

The application layer is the ultimate destination of the educational digital-intelligent transformation. Application-oriented undergraduate education focuses on cultivating talents with practical operational skills and comprehensive professional competence, emphasizing the close integration of knowledge application and production practice. As an important carrier of practical teaching, training bases can provide students with a real professional environment, enabling them to transform professional knowledge into vocational skills through practical operation on the basis of theoretical learning.11 The college introduces commercial projects such as brand operations, film and television production, and live-streaming e-commerce into the teaching process, forming an application closed loop of "learning by doing, and doing by learning." While participating in real projects, students not only master the operation of digital-intelligent tools but also understand market logic, teamwork, and innovation methods through practice. In this way, educational outcomes are no longer confined to the classroom but are directly translated into industrial value.

3. Innovations and Theoretical Value of the Model

The innovative significance of the "Technology-Discipline-Application" integration model lies not only in its novel structure but, more importantly, in its breakthrough in addressing the long-standing issues of "technological silos" and "disciplinary isolation" in educational digital-intelligent transformation, achieving overall synergy and structural reshaping of the educational system.

At the conceptual level, this model breaks away from the "technology-dominated" mindset prevalent in traditional digital-intelligent reform, placing "authentic application" at the center of the educational logic, thereby realizing a return to the fundamental value orientation of education. It emphasizes that the meaning of technology lies in serving teaching and talent development, rather than replacing the educational subjects, reflecting the unity of the humanistic and social dimensions of education.

Structurally, the model, through the interconnected design of the underlying technology platform, the middle-level discipline system, and the top-level application scenarios, shatters the linear structure of teaching processes, shifting towards a networked, ecological mode of knowledge production and dissemination. This "three-dimensional symbiotic" structure transforms the educational system from "static transmission" to "dynamic generation," forming a sustainable innovation mechanism.

In terms of value innovation, while the core output of traditional education is knowledge acquisition, the core output of this model is "capability generation." Empowered by technology and authentic application, student learning outcomes are no longer confined to exams and assignments but are directly manifested as demonstrable, evaluable project results. Teachers transition from "lecturers" to "mentors," students from "learners" to "makers," and education from "knowledge teaching" to "innovative practice." This shift achieves a value leap in education from "static evaluation" to "dynamic growth."

The Practical Pathway and Effectiveness Analysis of Qingdao Hengxing University of Science and Technology

The College of Arts and Media at Qingdao Hengxing University of Science and Technology, a pioneer in the digital-intelligent transformation of application-oriented universities in Shandong Province, has systematically constructed a practical example of the "Technology-Discipline-Application" three-dimensional integration model. Centered on the reform philosophy of "being driven by authentic application, supported by technological platforms, and focused on project-based teaching," its core pathway can be summarized into three key initiatives: constructing a digital technology foundation, restructuring a project-based curriculum system, and embedding real industrial projects. This has achieved a systematic leap from "digital teaching" to "intelligent education."

[11] Hao Lina, Research on the Construction and Operation Mechanism of Training Bases in Application-Oriented Undergraduate Universities. Plastics Packaging. 2025, 35(05)

1. Constructing the Digital Technology Foundation of the "Hengxing Capacity Platform + High-end Experimental Centers"

a. Overall Concept and Functional Positioning of the Platform Construction

Qingdao Hengxing University of Science and Technology has established a dual-support system with the "Hengxing Ubiquitous Capacity Teaching Platform" and the "Chaoxing Capacity Platform," building a digital teaching system that covers the entire process of teaching, management, and evaluation. This forms the underlying support architecture for the college's educational digital-intelligent transformation.

The Hengxing Ubiquitous Teaching Capability Platform focuses on the visualization and data-driven management of the teaching process, achieving full-process online integration—from consolidating course resources and assigning teaching tasks to collecting learning data. The platform supports multi-device interaction between teachers and students, real-time feedback, and project collaboration, facilitating the expansion of teaching scenarios and the continuous tracking of learning behaviors. Meanwhile, the Chaoxing Capability Platform plays a significant role in resource aggregation and intelligent analysis, covering modules such as course design, learning path recommendations, and evaluation analysis. It provides teachers with tools for course analysis and offers students a personalized learning space.

The college has innovatively extended the platform's functionalities into the realm of social dissemination by creating the "Hengxing Dialogue" live streaming series. This initiative integrates teaching activities, work exhibitions, and industry exchanges through online live broadcasts. According to platform statistics, the "Hengxing Dialogue" series has achieved a total viewership of 15,214, with single-session interactions exceeding 17,500 likes, forming a communication loop centered on the platform that connects "open teaching — social feedback — data-driven improvement." This mechanism not only expands the teaching space but also enhances the college's social influence and brand communication power.

b. Scenario Construction and Technological Support of High-End Experimental Centers

In terms of hardware infrastructure, the college has established a high-end experimental teaching system covering various fields such as film and television production, digital arts, and new media communication. The core experimental platforms comprise a comprehensive suite of advanced facilities designed to support practice-oriented teaching and innovation: a 4K Ultra-HD all-green studio and recording studio that enables multi-camera shooting and real-time broadcasting to create immersive learning environments for film, television, and communication courses; a digital special effects laboratory and MIDI laboratory that facilitate experimental instruction in post-production, sound design, and interactive media; a new media e-commerce live streaming laboratory and an innovation and entrepreneurship incubation laboratory that provide authentic e-commerce contexts for courses in brand communication, live-stream operations, and digital marketing; and graphics and image processing, graphic design, and post-production laboratories that together form a complete workflow for visual communication and digital art creation.

Furthermore, leveraging the Digital Art Experimental Teaching Demonstration Center and the Converged Media Command Center, the college has achieved integrated management of "teaching, practice, and dissemination." Through the digital management system, instructors can monitor equipment utilization rates and student project data in real-time, establishing a data-driven decision-making mechanism for teaching. This has propelled the shift in experimental teaching from being "experience-driven" to "data-driven."

Figure 7. 4K Ultra-HD All-Green Studio

Figure 8. Recording Studio

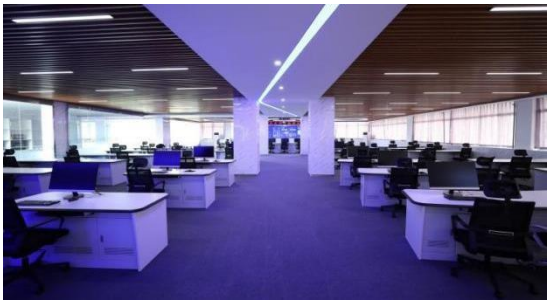

Figure 9. Digital Special Effects Laboratory

Figure 10. MIDI Laboratory, Innovation and Entrepreneurship Incubation Laboratory

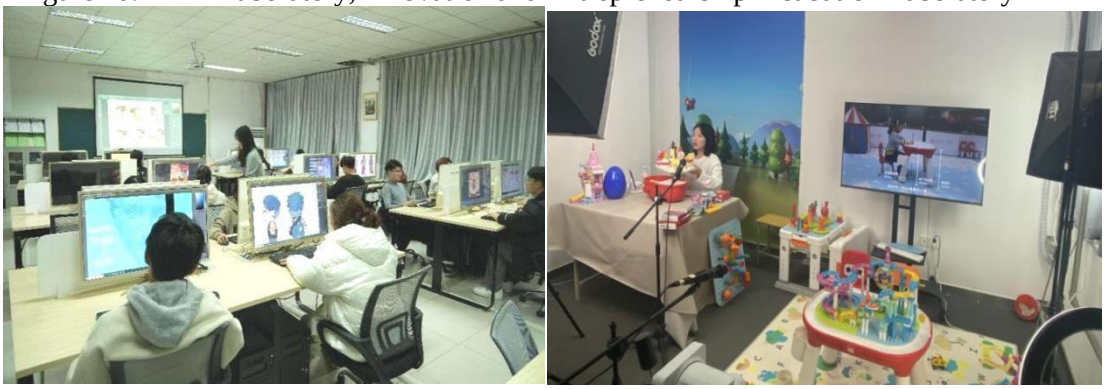

Figure 11. Graphics and Image Processing Laboratory, New Media E-commerce Live Streaming Laboratory

Figure 12. Film and Television Post-Production Laboratory, Graphic Design and Production Laboratory

2. Restructuring the Curriculum System Integrating "Project-Based and Studio Systems"

In traditional application-oriented university teaching, curricula are often centered around knowledge modules, emphasizing theory over practice and teaching over industry engagement. At Qingdao Hengxing University of Science and Technology, the digital-intelligent transformation in education adopts a dual-core approach of "Project-Based + Studio Systems" to restructure the curriculum. This shifts the teaching logic from "knowledge transmission" to "capability generation," achieving a dynamic, open, and task-oriented curriculum system.

Through collaboration with enterprises, brands, and media organizations, the college integrates real commercial projects into the classroom, forming an operable and evaluable system of teaching tasks. For example:

Students participated in the filming and post-production special effects work for the theatrical films Windbird and Little Qian, with some teams also involved in the composite special effects shots for The Wandering Earth 2, achieving a direct transition from the classroom to industrial projects.

In Digital Media Arts courses, students undertake tasks such as brand short video planning, advertising visual design, and live stream content creation, with project outcomes directly entering enterprise operational workflows.

In Advertising Photography and Visual Communication courses, students independently complete Brand Visual Identity System (VIS) designs based on market research, and their works have been adopted and applied by some companies.

Figure 12. On-Set Production and Filming for the Theatrical Release "Windbird"
Post-Production Visual Effects (VFX) Shot Compositing for the Theatrical Release "Little Qian"

Figure 13. Participated in VFX shot compositing for The Wandering Earth II

The introduction of project-based teaching has transformed courses from "theoretical instruction" to "problem-solving," and shifted teaching evaluation from "outcome assessment" to "process evaluation." Both teachers and students collaboratively participate in project design and post-project review, achieving a multi-dimensional integration of "teaching, learning, research, and production."

To ensure the sustainable operation of project-based courses, the college has established a multi-level studio system, including studios such as "Film and Television Production," "Digital Special Effects," "Brand Communication," and "Visual Creativity." Each studio is led by a faculty mentor and is responsible for the actual execution of projects both internal and external to the university. Through

this organizational form, the teaching space is extended into real industrial chains. Teachers' activities in instruction, research, and social service are integrated, while students' learning processes also become the formation process of professional.

The combination of the project-based system and the studio system has shifted the college's curriculum from being closed to open, and from single-discipline to cross-disciplinary. Students' initiative in learning has significantly increased, the social conversion rate of course outcomes has impr
oved, and the overall efficiency and practical depth of the college's teaching have been enhanced.

3. Embedding Teaching Applications with Real-World Projects such as "Brand Operations, Film and Television Production, and Live Streaming E-commerce"

The key reason why the educational digital-intelligent transformation at Qingdao Hengxing University of Science and Technology has achieved remarkable results lies in embedding "real-world projects" as educational scenarios throughout the entire teaching process. By establishing long-term cooperation mechanisms with enterprises and social institutions, the college integrates various types of projects—including brand operations, film and television production, and live streaming e-commerce—into the curriculum system, synchronizing students' learning processes with industrial operations. Specific practices include:

Brand Communication Direction: Students developed a brand promotion strategy primarily for the Xiaohongshu platform for the brand Guoshu Cake, covering product analysis, positioning, promotion pathways, photography, and copywriting, achieving a complete closed loop from research to execution.

Figure 14. New Media Communication Direction: Students operated a Douyin matrix account for the pet brand "Miao Ju She," cumulatively producing 60 short videos and managing 5 matrix accounts. Single videos achieved view counts ranging from 1,000 to 2,000, establishing stable communication traffic.

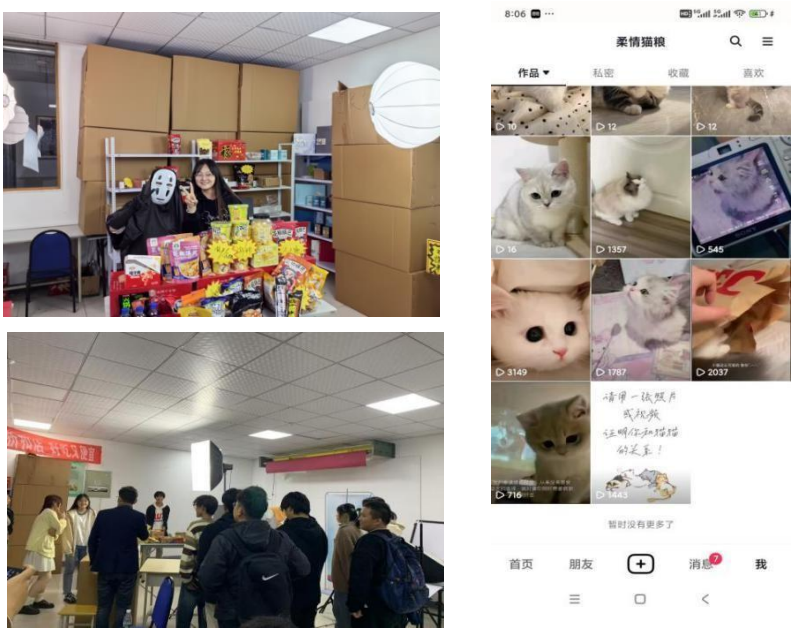

Figure 15. E-commerce Live Streaming Direction: Student teams conducted short video production and live stream sales for 7-Eleven convenience stores, achieving 6 live sessions per week. They cumulatively completed 30 short videos and facilitated 10,000 order conversions.

Figure 16. Film and Video Production Track: Students participated in various professional projects, including the theatrical film Metro Line 3, the recording of the Qingdao Hainuo School Arts Festival, and the production of a promotional video for Qingdao Hotel. Through these projects, they gained hands-on experience in the entire production workflow, from scriptwriting and planning to post-production.

Figure 17. The commencement ceremony for "Metro Line 3" Filming of the theatrical film "Windbird"

Figure 18. Recording of the Qingdao Hainuo School Arts Festival
Production of a promotional video series for Qingdao Hotel

These projects have not only provided students with authentic industry experience but have also established a stable chain of outcomes for the college's integration of industry and education. The college's official Douyin account amassed a total view count of over 900,000, with more than 7,600 likes and 1,500 collections within a year, creating a visible system for showcasing teaching achievements at the level of social dissemination. Using the digital platform as a link, the college has established a tripartite collaborative mechanism of "on-campus teaching — off-campus practical training — industrial application." On campus, relying on laboratories and studios, teaching and project development are completed; off-campus, through partnerships with enterprises and social institutions, project implementation and feedback optimization are achieved. Through this model, students can accumulate project experience during their studies, teachers concurrently fulfill research and social service roles in their teaching, and the college builds brand influence through industrial collaboration, truly realizing the integration of the education chain, talent chain, industry chain, and innovation chain.

CONCLUSION

The exploration of the "Technology-Discipline-Application" integration model by the College of Arts and Media at Qingdao Hengxing University of Science and Technology provides an instructive practical example for the digital-intelligent transformation of application-oriented universities in China. Its core experience lies in: being driven by "authentic application," using the "platform + scenarios" as the dual-base architecture for technology and teaching, and establishing a new educational ecology of "mentor-creator-product," achieving an organic unity of technological innovation, teaching innovation, and talent cultivation innovation. This integration is not a one-dimensional use of tools but a systematic reconstruction based on educational logic, reflecting a new stage in educational digital-intelligent transformation moving from "tool empowerment" to "ecological symbiosis."

In traditional educational informatization construction, technological platforms and teaching scenarios often exist in a state of separation: platforms are used for resource management and teaching monitoring, while teaching remains confined to the classroom. By constructing the dual-base architecture of the "Hengxing Capacity Platform + high-end experimental centers," Qingdao Hengxing University of Science and Technology has bridged the educational boundaries between online and offline, on-campus and off-campus, achieving an intelligent, data-driven, and scenario-based teaching process. The "platform" undertakes the functions of data integration, process management, and intelligent analysis, providing digital support for teaching activities. The "scenarios," relying on high-end experimental centers and real commercial projects, construct an immersive learning and practice environment. When the two form linkages, education shifts from a "spatial activity" to a "systematic ecosystem," achieving synchronous upgrades in technological empowerment and situational experience. The dual-base architecture of "platform + scenarios" not only addresses issues such as "idle equipment" and "fragmented resources" in the university's digital-intelligent process but also provides a new design approach for educational systems. At the teaching level, it achieves the integration of "online teaching resources — offline practical scenarios — learning data feedback." At the management level, it enables the digital visualization of educational decision-making and process traceability. At the talent cultivation level, it facilitates a deep transformation from knowledge learning to capability building.

The promotional value of this mechanism lies in its demonstration that the true breakthrough in educational digital-intelligent transformation does not lie in the accumulation of technology, but in the systematic synergy between technology and scenarios.

The ecological innovation embodied in "teachers as mentors, students as makers, works as products" signifies a leap in application-oriented university education from "transmissive teaching" to "generative education." In the practice of Hengxing University, the redefinition of educational roles is key to this educational ecology innovation. The traditional teaching system, centered on the teacher with students as passive recipients, featured one-way knowledge transfer. Post digital-intelligent transformation, the college has restructured teaching relationships around projects, forming a co-creative learning community where "teachers are mentors, students are makers." Within this ecology, the teaching process merges with the production process, the classroom becomes a site for incubating creativity, and projects become the medium for learning. Teachers and students collaboratively complete the entire process from idea generation and task division to outcome dissemination. Once works are launched into the market or onto media platforms, the resulting social feedback, in turn, informs and improves teaching design, forming a cyclical system of "teaching—production—dissemination." This ecological mechanism transforms education from a closed campus activity into an open system for social innovation. Driven by projects, educational outcomes and industrial value grow simultaneously: students create value through learning, teachers update their knowledge through mentoring, and the educational system evolves through practice.

Through the systematic implementation of the "Technology-Discipline-Application" three-dimensional integration model, Qingdao Hengxing University of Science and Technology has achieved a comprehensive upgrade in teaching models, curriculum systems, and educational management. The organization of teaching has shifted from traditional classroom lectures to project-based and studio systems, forming a "project-core, capability-oriented" learning mechanism. Course content is iterated in real-time based on platform data and project feedback, keeping pace with industrial development. The teaching evaluation mechanism integrates student learning outcomes with their social application effectiveness, forming a three-dimensional evaluation system of "process-output-application."

In summary, the exploration at Qingdao Hengxing University of Science and Technology demonstrates that the true breakthrough in educational digital-intelligent transformation lies in moving from a "technology-centric" to an "application-centric" approach, and from "teaching reform" to "educational reconstruction." The "Technology-Discipline-Application" three-dimensional integration model, with the "platform + scenarios" as its foundation and "projects + makers" as its driver, achieves a systematic upgrade of the educational value chain. It not only provides a practical pathway for resolving the structural contradictions in the transformation of application-oriented universities but also offers a replicable, scalable theoretical paradigm and practical model for the high-quality development of Chinese higher education in the digital-intelligent era.

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