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Teaching Reform Exploration on the Transformation of Environmental Design to New-Media Digital-Intelligent Majors Under the Background of Industry-Education Integration

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Abstract: Against the backdrop of steady advancement of the New Liberal Arts initiative and rapid development of the digital industry, the environmental design industry has gradually extended into smart cultural tourism, digital interaction, cultural IP derivative development and other fields. Market demand for interdisciplinary design talents with both artistic aesthetic attainments and digital technology application capabilities keeps growing. The traditional environmental design major has long adopted an established teaching mode and is confronted with prominent practical problems: disconnection between teaching content and industrial demands, fragmented delivery of digital-intelligent technology courses, incomplete practical teaching chains, and shallow-level industry-education collaboration. These issues create a noticeable gap between students' campus-acquired knowledge and corporate job requirements. Taking the Dimension Space Studio as the practical carrier, this paper builds a school-enterprise collaborative education platform, reconstructs an art-technology-integrated and project-driven modular curriculum system, deeply integrates cutting-edge digital-intelligent technologies into classroom teaching, and constructs a four-dimensional linkage education model of "Courses – Projects – Competitions – Industries". A series of teaching reform practices show that this reform path can effectively make up for students' deficiencies in digital-technology capabilities and break down barriers between classroom teaching and industrial practice. Meanwhile, practical difficulties have emerged in the reform process, including insufficient incentives for enterprises to participate in school-running and heavy workload in developing digital teaching resources. The experience of major transformation and major-group construction summarized in this research can provide practical references for the construction of art-design major groups in similar local undergraduate colleges.

Keywords: Industry-Education Integration; Environmental Design; New-Media Digital-Intelligence; Major Transformation.

1. Introduction

In the era of the digital economy, the digital upgrading of cultural and creative as well as cultural-tourism industries is accelerating continuously. New-business forms such as smart-cultural-tourism scenario construction, spatial interactive experience and cultural IP derivative development keep emerging, urging universities to make adaptive adjustments to the talent-training mode for environmental design majors. China's Education Modernization 2035 clearly proposes to deepen industry-education integration and promote interdisciplinary innovation in higher education. The New Liberal Arts initiative also advocates breaking disciplinary barriers of traditional liberal-arts majors, advancing the integration of art and technology, and cultivating interdisciplinary innovative talents compatible with the demands of the times. Centered on the planning, renovation and implementation of physical spaces, the traditional environmental-design major focuses its teaching on physical-space creation, while seldom covering emerging directions such as digital interaction, virtual space and cultural IP development. In recent years, corporate recruitment has attached increasing importance to graduates' practical capabilities in digital technologies. Though students trained under the traditional mode possess solid artistic aesthetic competence, their proficiency in applying digital technologies remains weak. They can hardly meet the post requirements of emerging business forms,

resulting in a mismatch between talent supply and industrial demand.

Against such a background, how local universities can advance the transformation of environmental design majors toward new-media digital-intelligence via industry-education integration based on their own school-running positioning has become a practical issue calling for urgent solutions in art-design teaching reform. Centering on the construction of the art-design and new-media digital-intelligence major group, this paper carries out teaching reform. Through reform measures including building school-enterprise collaborative platforms, reconstructing curriculum systems, innovating teaching modes and optimizing evaluation mechanisms, it addresses prominent pain points in current professional teaching.

A review of domestic and international relevant studies reveals that foreign art-design education launched art-technology integration practices at an early stage. Germany's Duales Ausbildungssystem and America's Cooperative Education Model have formed mature school-enterprise collaborative education systems. The MIT Media Lab and the Royal College of Art's Innovative Design-Engineering Program deeply integrate virtual reality, artificial intelligence and art-design teaching, establishing a talent-training mode featuring two-way empowerment between artistic creation and cutting-edge technologies. Domestic scholars have conducted extensive research on industry-education integration and art-major construction under the New Liberal Arts framework. Most studies confirm that industry-education integration serves as a critical path to connect talent training for design majors with industrial demands. Nevertheless, deficiencies persist in existing research: most studies on industry-education integration target engineering and economics-management majors, whereas research on the construction of art-design major groups remains scarce. Many studies merely introduce superficial applications of technical tools, lacking implementable paths tailored to the characteristics of environmental-design majors for emerging fields such as smart cultural tourism and IP derivation. Empirical case studies regarding the digital-intelligent transformation of environmental-design majors in local universities are still to be supplemented.

This paper mainly addresses four prominent teaching problems. First, resolve the disconnection between teaching content for art majors and industrial digital-intelligent demands, as well as the obvious gap between campus learning and workplace practice. Second, improve inadequate integration of digital-intelligent technologies and art teaching to compensate for students' shortcomings in digital-technology application. Third, tackle ambiguous major positioning and homogenization in interdisciplinary art-technology education. Fourth, perfect the practical-teaching system and reverse the long-standing teaching dilemma of "valuing theory over practice". This research comprehensively adopts literature-research, case-analysis, action-research, questionnaire-survey and interview methods. It analyzes domestic and international cases of art-technology integrated education to draw referable experience. Relying on on-campus teaching, action research is conducted, and reform schemes are iteratively optimized following the cycle of "planning – implementation – observation – reflection". Questionnaires are distributed and interviews are held among undergraduates, professional teachers and designers from cooperative enterprises to collect multi-party feedback data for research support.

Through teaching-reform practices, this paper aims to explore feasible paths for the digital-intelligent transformation of environmental-design majors in local undergraduate colleges, build an "Art + Technology + Industry" collaborative-education mode, comprehensively enhance students' comprehensive practical abilities, and deliver replicable practical schemes for the construction of art-design major groups in peer universities.

2. Relevant Concepts and Theoretical Basis

2.1 Definition of Core Concepts

Industry-Education Integration differs from simple school-enterprise internship cooperation. It emphasizes in-depth alignment between the whole-process university teaching and industrial production practice. Enterprises participate in the full talent-training chain covering curriculum development, classroom teaching, practical-project training and outcome evaluation, so as to realize organic connection

among the education chain, talent chain and industrial chain. When implemented in the field of art design, industry-education integration is not limited to arranging student internships in enterprises. Instead, real corporate projects, industrial technical standards and cutting-edge industrial demands should be internalized into daily classroom teaching[1].

The transformation of environmental design toward new-media digital-intelligence does not abandon its core competence in spatial creation. Rather, it expands upon conventional physical-space design. Targeting emerging business forms including smart cultural tourism, cultural IP derivation, user experience and virtual-interactive scenarios, it introduces diverse digital-intelligent tools into professional teaching, realizes parallel development of physical-space design and digital-virtual design, and cultivates interdisciplinary design talents proficient in both physical-space construction and digital-creative technologies[2].

Art-technology integration refers to interdisciplinary integration of art and technology, constituting one of the core reform directions for art disciplines under the New Liberal Arts framework. Breaking disciplinary barriers among art, computer digital-technology and cultural-tourism industries, this mode takes technology as a new medium for artistic expression and guides technical application with artistic aesthetics, achieving mutual empowerment of artistic creativity and digital technologies. Major-group construction means gathering relevant disciplinary directions led by a core major, sharing faculty, curriculum and training-platform resources to satisfy development demands of regional industrial clusters[3].

2.2 Theoretical Basis

First, the construction theory of the New Liberal Arts. The New Liberal Arts initiative advocates liberal-arts majors to break inherent disciplinary boundaries, promote interdisciplinary innovative development, and update talent-training objectives in response to practical social and industrial demands[4]. As a key field for New Liberal Arts construction, art design requires majors to step out of traditional disciplinary frameworks, proactively align with the development of the digital-cultural-creative industry, and embed digital technologies and industrial practice into the whole talent-training process[5].

Second, collaborative-education theory. Collaborative-education theory proposes that multiple stakeholders including universities, enterprises and industries participate in talent training, with each party giving play to its unique resource advantages. Universities excel in art-theory teaching and fundamental aesthetic education, while enterprises possess real-world projects and front-line practical experience[6]. Multi-party collaboration can make up for insufficient teaching resources of individual universities and maximize educational benefits.

Third, Outcomes-Based Education (OBE) theory. Starting from students' final learning outcomes, OBE theory designs teaching procedures and reversely formulates curricula, teaching activities and evaluation systems. Targeting the cultivation of interdisciplinary digital-intelligent design talents demanded by industries, this reform adjusts curricula and practical links in reverse to ensure graduates acquire comprehensive competencies matching post requirements[7].

2.3 Practical Inevitability of the Digital-Intelligent Transformation of Environmental-Design Majors toward New-Media

From the industrial perspective, the digital transformation of the cultural-tourism industry is accelerating, bringing forth emerging business forms such as smart scenic spots, digital cultural museums, rural cultural-tourism IP development and virtual exhibitions. The market no longer merely demands designers capable of drawing and renovating physical spaces. Numerous posts require practitioners to build virtual spaces, produce digital-scene renderings and develop cultural IP derivatives. Structural changes in industrial job demands impel universities to update talent-training content[8].

From the educational perspective, continuous advancement of the New Liberal Arts initiative vigorously boosts interdisciplinary integration of art and technology. If traditional environmental-design majors rigidly adhere to physical-space teaching without keeping pace with digital-creativity development, they will fall behind disciplinary progress and deviate from the orientation of higher-education reform. Promoting digital-intelligent transformation represents an inherent requirement for disciplinary upgrading of environmental-design

majors[9].

From the student-development perspective, graduates face fierce employment competition. Mastering only traditional spatial-design skills will greatly narrow employment options. Equipped with digital-intelligent design capabilities, graduates can engage in traditional interior and landscape design as well as digital cultural tourism, virtual exhibition halls and new-media creative industries, broadening career paths and enhancing employment competitiveness.

3. Prominent Existing Problems in Environmental-Design Teaching from the Perspective of Industry-Education Integration

Combining questionnaire surveys among environmental-design undergraduates, interviews with teachers and students, industrial investigations of cooperative enterprises and literature review, this research summarizes five practical pain points under the traditional teaching mode:

First, teaching content is disconnected from industrial digital-intelligent demands, giving rise to a striking gap between campus learning and workplace practice. The traditional environmental-design curriculum system centers on physical-landscape and interior-space design. Courses revolve around renovation and implementation of physical sites and barely cover popular industrial fields such as smart-cultural-tourism scenario construction, cultural IP derivative design and virtual-interactive spaces. Classroom training mostly adopts hypothetical simulation projects without support from real corporate commercial projects. Students complete highly idealized coursework without considering client requirements, cost constraints and implementation feasibility. When entering enterprises, they lack sufficient knowledge reserve for digital-project tasks, resulting in disconnection between classroom learning and real-world work.

Second, insufficient in-depth integration of digital-intelligent technologies and art teaching leads to prominent technical deficiencies among students. Teaching of cutting-edge software only covers basic operations. Emerging digital tools such as D5 Render and VR/AR virtual simulation are delivered in fragmented sporadic lectures or short-term training sessions without forming systematic curriculum modules. Technical teaching is separated from design-creation courses: software courses only teach tool operation, while design courses seldom adopt high-end digital-intelligent tools to accomplish full-cycle creative projects. Many students boast solid artistic creativity and aesthetic competence yet lack digital-expression approaches. Unable to produce virtual-scene and immersive-interactive works, they cannot fully realize their artistic conceptions via digital technologies.

Third, ambiguous major positioning renders interdisciplinary art-technology education vulnerable to homogenization dilemmas. Many local universities offering art-design majors have begun exploring reforms oriented toward digital art and new media. Nevertheless, some colleges simply add several digital-software courses without defining core development directions in light of their own school-running characteristics and local cultural-creative industrial features. If environmental-design majors blindly follow trends to launch new-media courses, their curriculum content is highly likely to overlap with that of digital-media-art majors. Consequently, they lose their professional foundation in spatial creation, witness weakened major characteristics and suffer severe homogenization in school-running.

Fourth, imperfect industry-education collaborative-education mechanisms result in the prevalent “universities eager yet enterprises passive” dilemma. While universities are highly motivated to promote industry-education integration, enterprises lack long-term incentives for school-running participation. Some school-enterprise cooperation merely stays at the superficial level of signing internship-base agreements. Enterprise tutors seldom give lectures on campus, and stable operating mechanisms for introducing real corporate projects into classrooms are absent. Moreover, clear institutional schemes are lacking concerning copyright ownership of project outcomes, intellectual-property distribution and shared project benefits after projects are introduced into teaching. Worried about leakage of commercial-project data and copyright disputes over student works, enterprises are reluctant to assign commercial projects for classroom teaching. Hence industry-education integration becomes

formalistic and deep-level collaboration cannot be realized.

Fifth, the practical-teaching system is incomplete and diversified teaching-evaluation mechanisms are absent. Traditional teaching prioritizes theoretical lectures over full-process practical training. Practical activities are limited to short-term off-campus internships, and in-class project-based practice is insufficient. In terms of assessment, course grades are mainly determined by on-campus teachers' grading of assignments with single evaluation subjects. Corporate designers and industrial practitioners rarely participate in course assessment, and achievements from discipline competitions and practical projects can hardly be converted into course credits. Evaluation criteria lay stress on visual aesthetics of drawings, ignoring industrial dimensions such as project implementability, digital-technology application and market adaptability. The evaluation system is therefore decoupled from industrial standards.

4. Teaching-Reform Practice of Promoting Environmental-Design's Transformation toward New-Media Digital-Intelligence Driven by Industry-Education Integration

Targeting the above-mentioned teaching pain points, this teaching-reform project proceeds from the actual school-running conditions of university environmental-design majors and carries out systematic reforms across five dimensions: major positioning, education platforms, curriculum systems, teaching modes and evaluation mechanisms, by virtue of industry-education integration.

4.1 Clarify Transformation Positioning and Establish Construction Objectives for the Art-Design and New-Media Digital-Intelligence Major Group

The digital-intelligent transformation of environmental design toward new-media does not discard core advantages in spatial design. On the basis of its root in spatial creation, it responds to development demands of local cultural-creative and smart-cultural-tourism industries in Shaanxi Province and forms a featured development direction of digital-cultural-tourism design. Led by the environmental-design major, relevant new-media digital-intelligent directions are integrated to build the art-design and new-media digital-intelligence major group. Its talent-training objective is defined as cultivating interdisciplinary design talents equipped with capabilities in physical-space design, digital-scene construction, smart-cultural-tourism planning and IP derivative design. Focusing on the core question of "what kind of talents to cultivate" for major-group construction, it sticks to the core of spatial creation, forms distinctions from pure digital-media-art majors, realizes differentiated school-running and avoids homogenization.

4.2 Innovate Industry-Education Collaborative-Education Mechanisms and Build the Practical Platform of "Dimension Space Studio"

Studios constitute core carriers for implementing industry-education integration. This project takes the on-campus Dimension Space Studio as a physical platform for school-enterprise collaborative education to connect classroom teaching and industrial practice.First, build dedicated mixed school-enterprise teaching teams for each course. All core practical courses are equipped with on-campus lead teachers plus enterprise industrial tutors. On-campus teachers deliver theoretical lectures and teach fundamental design knowledge. Tutors dispatched from front-line cooperative enterprises of cultural-creation and cultural-tourism design explain workflows of real-world industrial projects and industrial technical standards, guide students to implement commercial projects, and comment on the market feasibility of design proposals. On-campus teachers and enterprise tutors prepare lessons together and jointly compile course task books, abandoning the previous superficial-cooperation mode where enterprise tutors only deliver occasional campus lectures.Second, establish a transformation mechanism for introducing real corporate projects into classrooms. Cooperative enterprises entrust the studio with sub-tasks suitable for undergraduates, which are screened and converted into course topics. Instead of finishing hypothetical assignments only, students directly participate in the whole procedure of real-project preliminary research, conceptual design and digital-scene output. Teachers control project difficulty, prevent commercial-confidential-information leakage, and adapt commercial projects for teaching scenarios.Third, formulate schemes for outcome

sharing and intellectual-property distribution to resolve the "universities eager yet enterprises passive" dilemma. Cooperation agreements are signed in advance to clarify intellectual-property ownership of student-involved projects: copyright of commercially implemented outcomes belongs to enterprises; students may utilize relevant works for coursework, discipline competitions and portfolio compilation; teaching-research and case outcomes belong to universities. Clear definition of rights and obligations of all parties dispels enterprises' concerns over copyright disputes and data leakage, builds a win-win collaborative ecosystem and boosts enterprises' long-term enthusiasm for teaching participation.

4.3 Reconstruct an Art-Technology-Integrated, Modular and Project-Oriented Curriculum System

Retaining original core courses of environmental-design such as landscape design and interior design, disciplinary barriers are broken and new modular courses are developed targeting emerging business forms of digital cultural tourism and IP development. Industrial standards, real technical projects and industry-certification contents are incorporated into teaching materials.The curriculum system falls into three major modules. The first is the core foundation module for environmental design to consolidate basic skills in physical-space design. The second is the digital-intelligent-technology tool module, which delivers systematic instruction for relevant software technologies. Fragmented software teaching is discarded; tool learning is tightly bound to design projects so that technologies serve creative design. The third is the interdisciplinary expansion module covering smart cultural tourism, cultural IP derivation and user-experience design. Project-based teaching is adopted for all courses. Each course revolves around a complete design project, and students work in groups to complete the whole process of research, conceptual design, digital output and outcome presentation, getting rid of the former mode of fragmented knowledge-point indoctrination.

4.4 Empower Classrooms with Digital-Intelligent Technologies and Innovate Teaching Implementation Modes

The teaching process shifts from lecture-dominated traditional teaching to a new mode of "Project Practice + Virtual Simulation + Immersive Demonstration", with digital-intelligent technologies fully integrated into course teaching. After finishing spatial-design schemes, students are required to construct virtual-digital scenes beyond two-dimensional drawings and static renderings to achieve immersive spatial experience. VR immersive presentation is introduced in class reports. Students lead teachers and peers to experience their self-designed cultural-tourism spaces immersively, so that spatial-design effects can be displayed intuitively for comprehensive evaluation.

Teachers transform from mere knowledge imparters to project facilitators and supervisors. Driven by real-project tasks, students collect data independently, learn digital-software skills and complete design projects through group collaboration. Digital-technology learning is embedded in project tasks. Students proactively master software operations to fulfill project requirements, improving both technical capabilities and design creativity simultaneously and solving the separation between technical learning and design creation.

4.5 Construct a Four-Dimensional Linkage Education Model of "Courses-Projects-Competitions-Industries"

Four links including classroom courses, studio projects, discipline competitions and corporate industries are interconnected to form a closed-loop four-dimensional linkage education model. High-quality coursework is further polished and upgraded into studio projects; mature studio-project outcomes are optimized for discipline competitions; award-winning high-quality works are connected with enterprises via the studio for industrial implementation. Interconnection of the four links expands output channels for student design works. Teaching quality is improved through competitions, and classroom teaching is fed back by industrial projects, realizing precise alignment between talent training and industrial demands.

4.6 Build a Diversified Collaborative Teaching-Evaluation System

Reforming the traditional assessment mode relying solely on teachers' scoring, this paper establishes a diversified evaluation system

participated by both universities and industries. Course assessment no longer merely judges visual effects of final drawings. Evaluation indicators cover multiple dimensions: basic theories and design creativity, digital-technology application capabilities, project-research analysis, and teamwork. Scores from enterprise tutors are introduced, who judge proposals from industrial perspectives of implementability and market adaptability. Awards in discipline competitions and participation in real-world projects are converted into bonus points for courses. Multiple evaluators including on-campus teachers and enterprise tutors jointly constitute a quality-assurance mechanism to align evaluation criteria with industrial standards.

5. Reform Implementation Outcomes and Practical Reflections

This one-year teaching reform was carried out relying on environmental-design classes and the Dimension Space Studio. Phased outcomes have been achieved through curriculum reconstruction, project training and competition practice, while multiple practical constraints emerged in the implementation process.

5.1 Practical Outcomes of Teaching Reform

First, at the student level: students' practical capabilities in digital-intelligent technologies have been markedly enhanced. After curriculum reform, students are no longer limited to outputting static renderings. They can proficiently build digital-cultural-tourism scenes using UE, VR and other tools. A large number of students optimize their coursework and studio projects for discipline competitions. Project-oriented training strengthens students' capabilities in project research and implementation-oriented thinking. Instead of pursuing visual effects only, students' works give more consideration to practical implementation constraints. The proportion of digital-virtual-design works in student portfolios rises substantially. Students gain clearer understanding of posts related to digital cultural-creativity and smart cultural tourism, and their employment options are broadened.

Second, at the teaching-resource and platform level: supporting resources for teaching reform have been accumulated. During the reform, teaching cases derived from corporate projects, course teaching plans and outstanding student works are sorted out to form a supporting teaching-resource library. Through practice, operating procedures of the Dimension Space Studio and the dual-teacher collaborative-teaching system are refined to form a replicable institutional system, laying a foundation for further deepening subsequent major-oriented reforms.

Third, at the faculty-construction level: comprehensive capabilities of on-campus teachers are improved. Joint lesson preparation and co-teaching between on-campus teachers and enterprise tutors enable university instructors to access cutting-edge industrial projects and technologies, compensating for their insufficient front-line industrial practical experience. By giving lectures on campus, enterprise tutors become familiar with university teaching rules, realizing mutual growth of school and enterprise faculty.

5.2 Practical Difficulties Encountered in Reform Implementation

First, insufficient long-term incentives for enterprises to participate in school-running. Even with formulated intellectual-property distribution schemes, enterprise participation in teaching requires substantial human-resource and time input. As commercial enterprises prioritize production and operation, they can hardly allocate sufficient manpower to engage in the whole talent-training chain. The supply of corporate projects fluctuates with business conditions, so stable project sources cannot be fully guaranteed.

Second, enormous workload for developing digital-intelligent teaching resources. Art-technology-integrated courses belong to emerging directions, and mature supporting textbooks and teaching-case resources are scarce. Teachers need to independently develop course cases and teaching materials based on corporate projects, investing massive time and energy amid heavy teaching-research workloads.

Third, difficulty in balancing students' artistic aesthetic attainments and digital-technology capabilities. Some students devote excessive energy to software learning and blindly pursue spectacular digital visual effects while ignoring core creativity of spatial design. Others value artistic creativity but are afraid of learning digital software, resulting in backward technical proficiency. Balancing artistic creativity and digital-technology competence remains a

long-term dynamically-adjustable teaching challenge.

Fourth, digital-intelligent capabilities of teaching teams still need improvement. Senior teachers possess rich traditional-teaching experience yet insufficient mastery of emerging digital-intelligent tools such as VR and D5 Render. Building interdisciplinary teaching teams suitable for art-technology-integration reform demands sustained long-term investment.

5.3 Optimized Countermeasures and Suggestions

First, improve two-way incentive mechanisms between universities and enterprises. Universities shall perfect the recognition and reward system for enterprise tutors undertaking teaching tasks. Meanwhile, actively apply for local government support policies for industry-education integration to reduce comprehensive costs for enterprises participating in education and further mobilize their enthusiasm. Expand the pool of cooperative enterprises to dispel risks of fluctuating project supply caused by individual enterprises' business volatility and guarantee continuous and stable project provision.

Second, develop digital-teaching resources step-by-step. Adopt an iterative-accumulation mode alongside reform implementation: continuously accumulate course cases and excellent student works based on teaching-reform projects and compile case collections. Encourage on-campus teachers to co-compile teaching materials with enterprise tutors so as to gradually alleviate the shortage of textbook resources.

Third, implement hierarchical guidance in teaching to balance artistic creativity and digital-technology competence. Clarify the teaching orientation that "technologies serve creativity and artistic creativity comes first" in courses. Set hierarchical tasks for students who fear technical learning to lower entry barriers and teach students in accordance with their aptitude.

Fourth, continuously strengthen faculty-team construction. Encourage professional teachers to receive on-the-job training in enterprises and participate in industrial digital-projects. Regularly invite industrial experts for technical training to enhance teachers' digital-intelligent teaching capabilities and build a teaching team compatible with art-technology-integration reform.

6. Development Paths and Promotion Enlightenments for the Digital-Intelligent Transformation of Environmental-Design Majors

Practical feasible paths for the digital-intelligent transformation of environmental-design majors in local undergraduate colleges can be generalized from this project's practice. Local universities carrying out such reforms shall not copy construction modes of key universities wholesale, nor blindly pile up various technical tools. First, reforms must be rooted in original major foundations, preserve core advantages of environmental design in spatial creation, and refine featured development directions in combination with local cultural-creative and cultural-tour-ism industrial characteristics to avoid school-running homogenization. Second, take studios as carriers for industry-education-integration implementation, improve supporting systems including dual-teacher teams, project introduction into classrooms and intellectual-property distribution, so as to translate industry-education integration from signed cooperation agreements into daily teaching practice. Third, reconstruct curricula under modular and project-oriented ideas, embed digital-intelligent technologies into complete design projects instead of offering isolated software courses alone. Fourth, build a diversified evaluation system, connect courses, projects, competitions and industries, and construct a closed-loop talent-training system.

The practical experience of this teaching reform can offer references for teaching reforms of art-design majors in similar local application-oriented undergraduate colleges in China. Many local universities offering environmental-design majors are confronted with transformation pressures brought by industrial digitalization. The studio-operation mode, curriculum-reform ideas and diversified-evaluation schemes formed in this research can serve as practical models for peer universities. Institutions may adjust schemes according to their regional industrial conditions and faculty resources instead of total copying.

Meanwhile, this research has certain limitations. The teaching-reform cycle lasts merely one year, so reform effects require longer-term teaching practice for continuous verification. Survey

samples are mainly collected from this university and its cooperative enterprises. Follow-up research may expand the investigation scope to include more universities and enterprises. Future work will continuously deepen school-enterprise collaborative partnerships, iteratively update course content, track graduate-employment feedback and further optimize the talent-training system for interdisciplinary design talents.

7. Conclusion

Against the era background of steady advancement of the New Liberal Arts initiative and rapid development of the digital industry, promoting the transformation of environmental-design majors toward new-media digital-intelligence represents not only an objective requirement of industrial development but also an internal demand for self-upgrading of art-design majors in local universities. Traditional environmental-design teaching suffers from multiple drawbacks including disconnection between learning and practice, insufficient integration of digital-intelligent technologies, formalistic industry-education collaboration and imperfect practical-evaluation systems. Centered on industry-education integration and taking the Dimension Space Studio as the practical carrier, this teaching-reform project promotes the construction of dual-teacher teaching teams, reconstructs an art-technology-integrated, project-based and modular curriculum system, deeply embeds digital-intelligent technologies into classroom teaching, establishes the four-dimensional linkage education model of "Courses – Projects – Competitions – Industries", and builds a multi-participant diversified teaching-evaluation system. Reform practices effectively compensate for students' deficiencies in digital-technology capabilities, break down barriers between classroom teaching and industrial practice, and achieve phased teaching outcomes.

Art-technology-integration reform under industry-education integration cannot be accomplished overnight. Practical problems such as insufficient incentives for enterprise participation, heavy pressure of teaching-resource development and teachers' inadequate digital-intelligent competence will accompany the whole reform process. Sustained joint efforts from universities, enterprises and teachers are required, together with improvement of supporting incentive systems and phased steady advancement. The major-transformation paths explored in this paper can provide practical references for the construction of art-design and new-media digital-intelligence major groups in local undergraduate colleges. Follow-up work will keep track of teaching practice, update teaching content iteratively in response to emerging business forms, and continuously optimize the training system for interdisciplinary design talents.

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