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Research and Practice on the "Four-Dimensional Innovation" Model for Cultivating Design Talents in the Context of Hainan International Design Island

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Abstract: Against the backdrop of constructing Hainan International Design Island, this paper investigates the "Four-Dimensional Innovation" model and its practical reform in cultivating design talents at Hainan Tropical Ocean University. The model advances teaching reform for design majors through four dimensions—concept innovation, curriculum innovation, mechanism innovation, and evaluation innovation—by integrating industry-university-research-application collaboration, university-enterprise cooperation, academic competition integration, and research-backed teaching. Taking the Information Design course as a practical vehicle, the study introduces real-world corporate projects, restructures course content and teaching methods, establishes a "course-competition integration" mechanism, and transforms research outcomes into teaching cases, thereby forming an integrated implementation path of "industry linkage, pedagogical innovation, competition empowerment, and research feedback." Practice shows that the "Four-Dimensional Innovation" model effectively promotes the construction of design curricula, optimizes teaching content and processes, significantly enhances students' practical innovation ability and international competitiveness, and meets the talent development needs of local Hainan enterprises under the International Design Island initiative.

Keywords: International Design Island; Talent Cultivation; Four-Dimensional Innovation; Industry-education Integration; Information Design.

1. Introduction

Issued in 2020, the Overall Plan for the Construction of Hainan Free Trade Port clearly sets two core tasks: building Hainan into an international design hub and further opening up professional services to the global market [1]. Positioned as a pillar industry for Hainan's economic transformation, the design sector is poised to create large numbers of jobs and maintain sustained growth under this policy framework. Benefiting from its unique tropical geography and diverse ecological endowments, Hainan boasts distinctive regional cultural assets: time-honored ethnic cultures, deep-rooted marine heritage and a wealth of intangible cultural items. High-end international exchange platforms including the Boao Forum for Asia and Hainan Island International Film Festival further expand application scenarios for design innovation and provide abundant creative resources for industrial upgrading [2].

Yet empirical data from local design firms paints a mismatched picture: talent output from local universities has not kept pace with the rapidly expanding demand of the free trade port's design market. This structural mismatch between higher design education and industrial needs has become a growing bottleneck for development [3]. Bridging this gap carries practical significance for both the inheritance of Hainan's local culture and the long-term growth of its regional economy.

Building on this practical gap and our team's preliminary teaching reform experience since 2022, this paper puts forward a "Four-Dimensional Innovation" talent cultivation model spanning concept, curriculum, mechanism and evaluation. Taking the core Information Design course at Hainan Tropical Ocean University as a practical case, this research explores a replicable reform path to improve the quality of design talent cultivation in Hainan's universities and serve the high-quality development of the Free Trade Port.

2. Analysis of the Development of Hainan's Design Industry and the Current Situation of Talent Cultivation

2.1. Development History and Current Status of Hainan's Design Industry

The development of Hainan's design industry has gone through three key stages, during which its scale has gradually expanded with policy support and market demand, forming a distinctive system centered on "four leading industries." In the early stage of the province's establishment (1988-2000), Hainan's design industry mainly relied on tourism, focusing on basic areas such as hotel and scenic area planning. During the International Tourism Island construction period (2010-2020), the cultural and creative industry gradually diversified. The government issued the Implementation Plan for Promoting the Integrated Development of Cultural Creativity, Design Services and Related Industries in Hainan Province (2015-2020), encouraging the integration of design with tourism, agriculture and other industries. Intangible cultural heritage elements such as Li brocade and coconut carving began to be incorporated into the design of tourism products[2]. However, during this period the design industry was still dominated by small and micro enterprises, lacking large-scale effects.

According to the Hainan International Design Island Industrial Development Plan issued in June 2022, Hainan Province set clear development targets: by 2025, the total output of the design industry will reach 15 billion yuan, the number of design enterprises above a designated scale will exceed 90, and the number of design practitioners will exceed 12,000[2]. As disclosed by the Hainan Provincial Department of Industry and Information Technology at a press conference in August 2023, as of July 2023 the province had 160,000 enterprises involved in design-related businesses, including 73,000 in advertising design, 4,570 in industrial design, and 1,140 in architectural design.

At present, Hainan's design industry has formed a characteristic system centered on the "four leading industries" (see Table 1). In terms of talent cultivation, 15 universities in the province offer design-related majors, with 11,200 enrolled students. In 2023, these programs graduated more than 3,200 design students. This provides an initial talent reserve for the construction of Hainan International Design Island, but compared with the planning targets, there is still considerable room for improving the scale of talent cultivation.

Table 1. Four major sectors of Hainan's design industry and their sub-sectors

Core Sector	Sub-sectors
Cultural & Tourism Creative Design	Tourism product development (Li brocade, coconut carving, etc.), cultural IP design (e.g., Dongpo cultural IP), specialty packaging design (agricultural products, duty-free goods), tourism route planning (rainforest exploration, island tours)
Architectural & Environmental Design	Landmark architecture design (eco-integrated), interior design (hotels, commercial spaces), landscape design (tropical plant applications), public space design (plazas, stations)
Industrial Design	High-end equipment design (new energy vehicles, drones), medical device design (peptide synthesizers, neuromodulation devices), consumer electronics design, material and process innovation
Digital Creative Design	Game and animation design (Chinese animation going global, mini-games), digital content development (short dramas, AR/VR), interaction design (duty-free shopping scenarios), digital cultural IP (3D rendering of Li-Miao elements)

Although Hainan's design industry has developed rapidly, the problem of an incomplete industrial system has gradually emerged. The local architectural design sector has grown relatively prominent, while the fashion design and industrial design sectors remain weak. Due to the region's level of economic development, local design companies in Hainan have long faced the dilemma of talent shortages, encountering significant resistance in brand enhancement.

2.2. New Requirements for Talent Cultivation under the Construction of the International Design Island

Hainan International Design Island aims to deeply integrate traditional design industries with emerging technologies such as artificial intelligence, big data, 5G, and VR/AR, and to develop emerging fields such as interaction design and smart city design, thereby promoting the construction of the Free Trade Port through innovative design. Information visualization is a research field that presents abstract data through intuitive visual representations, integrating interdisciplinary areas such as computer graphics, human-computer interaction, and artificial intelligence [4]. The design industry demands high standards in terms of economic culture and business environment, with talent and technology being its core elements. Cultivating versatile and innovative talents for local design enterprises has become a critical challenge for universities in Hainan. Industrial upgrading requires design talents to possess interdisciplinary knowledge structures and digital technology application skills, while the international orientation demands that design talents have a global vision and cross-cultural communication abilities.

2.3. Current Situation and Problems of Design Talent Cultivation in Hainan's Universities

2.3.1. Cultivation Scale and Professional Distribution

In recent years, with the advancement of Hainan International Design Island construction, the scale of design majors in Hainan's universities has been continuously expanding. Currently, universities offering design-related programs in Hainan mainly include Hainan University, Hainan Normal University, Hainan Tropical Ocean University, Haikou University of Economics, and Sanya University. These institutions offer undergraduate programs such as Visual Communication Design, Environmental Design, Product Design, Fashion and Accessory Design, and Digital Media Art, producing approximately 1,500–2,000 design graduates annually [3].

Looking at how majors are distributed across institutions, Visual Communication Design and Environmental Design have the widest coverage, with nearly all design programs including these two directions. By contrast, majors tied directly to emerging industrial sectors — including Industrial Design, Interaction Design and Digital Creative Design — are offered at far fewer universities. This mismatch means the current major structure cannot fully match the layout of the four leading industries highlighted in the Hainan International Design Island development plan [2].

2.3.2. Main Problems

Combined with existing research findings and our long-term teaching observations, we summarize three core constraints limiting the quality of design talent training in Hainan's universities. First, outdated training philosophies create a gap between graduate competencies and real industry needs. Most local programs still follow a skill-centric training model, prioritizing technical proficiency in hand-drawing and design software operations. The current market, however, places greater value on talents with innovative thinking, interdisciplinary knowledge backgrounds and an international mindset. The existing curriculum remains heavily weighted toward theoretical instruction, practical teaching content often deviates from real industry requirements, and talent training programs are generally slow to update [3].

Second, graduates lack strong international competitiveness, and there is insufficient support for talent introduction and international training. Hainan still has room to optimize supporting policies covering talent visa processing, social security for foreign talents, and the integration of high-quality international educational resources. Local students also show clear gaps in global perspective building and cross-cultural communication competence. Third, the integration of industry and education remains

superficial, which restricts the development of students' practical innovation ability. For now, industry-education cooperation in most local universities stays at relatively shallow levels — primarily signing framework agreements and inviting industry practitioners to give occasional lectures — rather than being embedded into the full process of professional teaching and talent cultivation [5]. Concrete issues include: overly limited forms of university-enterprise cooperation, with little deep collaboration such as joint curriculum development and co-directed research projects; inadequate practical teaching resources; a shortage of dual-qualification teachers with both academic qualifications and industry experience; and an evaluation system disconnected from industry standards, where student performance is assessed mainly through final exams and coursework, with minimal input from industry partners.

3. Construction of the "Four-Dimensional Innovation" Model for Cultivating Design Talents

3.1. Theoretical Basis for Model Construction

The development of the four-dimensional innovation talent cultivation model draws on three core theoretical foundations: constructivist learning theory, industry-university-research-application collaboration theory, and outcome-based education (OBE) philosophy.

Constructivist learning theory posits that learning is an active process where learners build knowledge within authentic contextual scenarios, rather than passively absorbing delivered information. For design disciplines, this theory underpins the rationality of project-based and case-driven teaching approaches. Within our proposed model, students engage directly with real enterprise projects, building professional knowledge and improving practical competencies in the process of addressing real-world design challenges.

Industry-university-research-application collaboration theory highlights the value of deep integration and resource sharing across higher education institutions, enterprises, research bodies and practical application scenarios [5]. Against the backdrop of Hainan International Design Island development, this theoretical perspective calls on universities to break down institutional barriers, proactively align with industry demands, and integrate real project briefs and cutting-edge industry technologies into the full teaching cycle.

The OBE philosophy takes learning outcomes as its core orientation, stressing that teaching goals, curriculum content, instructional methods and assessment mechanisms should all be designed around predefined expected learning outcomes [6]. It advocates for building a competence-focused evaluation system with multi-stakeholder participation, combining formative process assessment and summative final assessment to capture a full picture of students' overall abilities.

These three theories support the four-dimensional innovation model at three distinct levels: instructional methodology, university-enterprise cooperation mechanism, and talent evaluation system. Constructivism informs the reform of specific teaching methods, collaboration theory guides the deepening of university-enterprise cooperation mechanisms, and OBE philosophy shapes the innovation of the evaluation system. The three complement one another and together form the complete theoretical underpinning of the model.

3.2. Defining the Four-Dimensional Innovation

The proposed four-dimensional innovation model frames four core leverage points — concept, curriculum, mechanism and evaluation — as the entry points for reform, with the goal of building a new design talent cultivation paradigm adapted to the development needs of Hainan International Design Island. Concept innovation answers the directional question of what type of talents to cultivate; curriculum innovation addresses the content question of what resources to use for cultivation; mechanism innovation responds to the procedural question of how to deliver cultivation; and evaluation innovation tackles the assessment question of how to measure cultivation effectiveness. The four dimensions reinforce one another, advance through iterative cycles, and jointly form a complete closed loop for talent cultivation. Table 2 details the specific connotations and positioning of each dimension.

Table 2. Connotations and positioning of the "Four-Dimensional Innovation" model

Dimension	Innovation Connotation	Core Problem Addressed
Concept Innovation	Shift from "skill-oriented" to "innovative, interdisciplinary, and internationally-oriented"	Outdated cultivation philosophy disconnected from industry needs
Curriculum Innovation	Build a curriculum system integrating "design + industry + digital + international"	Single curriculum structure lacking cross-disciplinary integration
Mechanism Innovation	Deepen university-enterprise cooperation and industry-university-research-application collaborative education mechanism	Shallow industry-education integration remaining at the agreement-signing level
Evaluation Innovation	Establish a competency-oriented, multi-stakeholder participation evaluation system	Single evaluation method lacking industry and enterprise participation

Under this overall framework, each dimension has clear implementation requirements. Concept innovation calls for shifting the core training goal from a skill-focused model to an innovation-driven, interdisciplinary and internationally oriented model, building a three-in-one training orientation centered on innovation capacity, interdisciplinary knowledge structure and global vision. Curriculum innovation focuses on building an integrated curriculum system covering design expertise, industry practice, digital competencies and international perspectives, breaking down silos between different course modules through targeted integration. Mechanism innovation requires deepening university-enterprise cooperation and the industry-university-research-application collaborative education mechanism, setting up a dedicated training system for dual-qualification teachers, and embedding industry-education integration across all stages of the teaching process [5]. Evaluation innovation means establishing a competence-oriented assessment system with multi-stakeholder participation, combining process-based and summative assessment methods to deliver a comprehensive evaluation of students' overall abilities [6].

3.3. Overall Framework and Operational Mechanism of the Four-Dimensional Innovation Model

The model's overall operational framework positions concept innovation as the guiding direction, curriculum innovation as the core implementation carrier, mechanism innovation as the institutional safeguard, and evaluation innovation as the feedback and optimization link. The four elements support one another and operate in a continuous iterative cycle. In practice, concept innovation defines the overall direction of talent training, curriculum innovation provides the core content support, mechanism innovation guarantees smooth implementation of teaching activities, and evaluation innovation tests training outcomes and feeds findings back to update and refine the cultivation concept. Taken together, they form a closed-loop operational logic of goal setting → content design → implementation delivery → evaluation assessment → feedback optimization, which drives the steady improvement of talent cultivation quality over time.

4. Practical Exploration of the "Four-Dimensional Innovation" Model Based on the Information Design Course

4.1. Nature and Positioning of the Information Design Course

Information Design is a core course in the Visual Communication Design major. It requires students to learn and understand the basic theories of information design, master correct information visualization design methods and creative expression techniques, and focuses on cultivating students' abilities in information collection, information organization, information visualization structuring and architecture, and information visualization design [7]. This course is comprehensive, practical, and forward-looking, covering multiple aspects such as information organization, visual transformation, and narrative expression. It is primarily project-based and involves digital technologies such as data visualization and interaction design, making it a suitable practical vehicle for the "Four-Dimensional Innovation" model.

The reasons for choosing this course as a case study are as follows: First, the course is highly comprehensive and practical, making it suitable for testing the teaching effectiveness of the "Four-Dimensional Innovation" model. Second, the course involves the application of digital technologies and the integration of interdisciplinary knowledge, which is highly aligned with the talent demands of the Hainan International Design Island construction. Third, the project leader has extensive experience in teaching reform and has conducted multiple research projects around this course [7], establishing a solid practical foundation.

4.2. Implementation Pathways of the Curriculum Reform

The research team carried out a systematic reform of the Information Design course around the concept of integrating "industry, teaching, competition, and research," forming a four-in-one implementation pathway of "industry linkage, pedagogical innovation, competition empowerment, and research feedback."

First, industry linkage. The team established in-depth cooperative relationships with enterprises such as CDFG (China Duty Free Group), Deep Sea Lionfish Culture Technology Co., Ltd., and Hainan Hanlin Cultural Innovation New Media Communication Co., Ltd., introducing real corporate projects into the course teaching. For example, real corporate projects such as "Festival IP Image Design," "Marine Science Popularization Information Visualization," and "Hainan Regional Cultural New Media Communication Design" were introduced, directly transforming industry needs into course modules. At the same time, "Corporate Mentor Workshops" were established, inviting enterprise experts to participate in offline teaching and guiding students through the entire process from needs analysis to solution implementation.

Second, pedagogical innovation. In terms of course content, the team closely focused on the two major directions of "cultural tourism creative design" and "digital creative design" in the construction of Hainan International Design Island, integrating international design island industry standards into teaching, revising the course syllabus, and adding modules such as "Industry Awareness of the International Design Island" and "Commercial Design Ethics." In terms of teaching methods, the team built a dedicated teaching resource library for Information Design integrating three types of resources: "industry cases, international design standards, and regional cultural materials." At the same time, the team proposed the "PBL+CDIO" integrated teaching method, using "Hainan Regional Cultural Information Visualization" and "Marine Ecological Information Visualization" as driving projects to guide students through the entire process of conception, design, implementation, and operation through group collaboration.

Third, competition empowerment. The team fully integrated academic competitions into the course practice system, building a cultivation chain of "course learning → pre-competition training → competition practice." By transforming the standards of competitions such as the National College Student Computer Design Competition, the Future Designer · National College Digital Art Design Competition (NCDA), and the Milano Design Week into course practice indicators, targeted thematic teaching and training were carried out.

Fourth, research feedback. The team systematically transformed the research results of the Hainan Provincial Philosophy and Social Sciences Planning Project and horizontal projects undertaken by the project leader into teaching cases and training modules for the Information Design course, deeply integrating them into core teaching aspects such as "Information Design Creative Methods" and "Commercial Design Practice." At the same time, the team selected outstanding students to participate in the teacher's research sub-projects, guiding them to assist in cultural data organization, visualization sketch design, and other work.

4.3. Practical Outcomes

After three complete teaching cycles of practical testing, the curriculum reform has achieved results in multiple aspects. In terms of teaching resource construction, a digital teaching resource library integrating three types of resources—industry cases, international design standards, and regional cultural materials—was established. A total of 32 real corporate cases, 8 international design standard interpretation

videos, and 15 sets of Hainan local cultural digital materials were uploaded, with the resource library utilization rate reaching 92%. In terms of students‘ practical abilities, based on the course outcomes, students won a total of 69 awards in various academic competitions, including more than 60 awards at the provincial level and above. Five information design works created by students were publicly published in Hunan Packaging. In terms of industry-education integration, a total of over 140 students from three cohorts participated in real corporate projects, completing 18 feasible design solutions, three of which were adopted by enterprises, with some students obtaining internships or employment opportunities. In terms of research feedback, the research results of the Hainan Provincial Philosophy and Social Sciences Planning Project and horizontal projects were transformed into teaching cases, and five students participated in research sub-projects, completing the publication of five design works.

5. Summary

Under the background of Hainan International Design Island construction, this study has proposed a “Four-Dimensional Innovation” model for cultivating design talents, covering the four dimensions of concept, curriculum, mechanism, and evaluation, and has carried out a practical exploration using the Information Design course as a case study. The research shows that this model can effectively promote the construction of curriculum systems, optimize teaching content and processes, and enhance students‘ innovation ability and international competence. The theoretical contribution of this study lies in systematizing the concept of “university-enterprise cooperation and integration of industry, university, research, and application” into a four-dimensional framework of “concept, curriculum, mechanism, and evaluation,” providing an operable analytical tool for research on design talent cultivation.

At the same time, this study has certain limitations: the case study involves only one course, so the generalizability of the findings needs further verification; the research period is limited, and the long-term effects need continuous tracking. In the future, the scope of cases can be expanded to cover more design major courses, and the application and promotion of this model in other universities can be explored.

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3. "Sea-Data Integration": Project-Based Teaching Reform of the Digital Composition Basics Course Based on the OBE Concept (Project No. Hnjg2026-117).

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