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Research Article

Research on the Upgrading Path of Design Discipline Construction in Application-oriented Universities from the Perspective of Symbiosis

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Abstract

Against the backdrop of the dual transformation of the economy and society and the transformation of government roles, design studies, as an emerging interdisciplinary discipline, necessitates systematic upgrading aligned with social development. Currently, the disciplinary construction of design studies is confronted with the dualistic antagonism between the "research-oriented" and "application-oriented" orientations. In response to the requirement of "characteristic development of application-oriented universities" proposed in the *Outline for the Construction of an Educational Power (2024–2035)*, as well as Zhejiang Province's strategy for the integration of the digital economy and cultural industries during the 14th Five-Year Plan period, this research takes "digital civilization" as the contemporary context. Based on the symbiotic exploration of the "height" of disciplinary characteristics, the "length" of sustainability, and the "width" of coordinated development, it reconstructs the construction logic of the application-oriented discipline of design studies, thereby facilitating the upgrading path of local undergraduate universities from "following" to "leading".

Keywords

Design Studies, Discipline Construction, Interdisciplinary Symbiosis, Fashion Design, Environmental Humanities, Cultural Resources

1. Preface

In the context of strengthening interdisciplinary integration and serving the needs of socioeconomic development, design studies, as a comprehensive discipline integrating art, humanities, and technology, holds an important position in the overall development layout of the college. Especially in the current era of rapid artificial intelligence development, the deep integration of design studies and intelligent technology has transcended the level of mere tool application. Together, they are redefining the paradigm of cultural innovation, becoming a core driving force for the innovation of educational models and the intelligent upgrading of industries, and serving as an important support for application-oriented universities to expand the characteristics of digital-intelligent discipline construction and enhance overall competitiveness.

In recent years, grounded in the college's orientation as an application-oriented university, the design discipline has adhered to the construction concept of "integration of design and digital technology, and integration of humanities and technology", with

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the direction of "promoting the integrated and coordinated development of disciplines, programs, regional services, and industry-education integration". Taking into account the college's development foundation and the actual situation of the talent team, the discipline has gradually clarified the connotation of an "application-oriented" discipline, integrating research content in urban planning, local fashion, and cultural translation, and has achieved relatively rich results. However, against the backdrop of economic and social transformation, the design discipline also faces many opportunities and challenges. How to further explore design pathways such as creative design, fashion design, data computing, and cultural translation from an interdisciplinary perspective, and how to systematically analyze the methods and technologies of urban planning, regional governance, and cultural translation by integrating multiple disciplinary perspectives, in order to address issues such as urban development, social services, and cultural governance—these constitute the key research content for subsequent discipline construction.

2. Current State and Trends of Research at Home and Abroad

2.1. Review of the Current State of Research at Home and Abroad

As the first interdisciplinary discipline in China explicitly designated to confer both artistic and engineering degrees, the disciplinary positioning of design studies has continuously evolved with the times. The release of the 2011 edition of the disciplinary catalog signaled a move toward independent disciplinary development. The 2022 edition further reinforced a technology-driven orientation by prioritizing engineering-related terminology. This adjustment highlights the forward-looking nature of the discipline and reflects the global trend of integrating "technology, design, and humanities" over a century of design studies development.

Based on a literature review and empirical investigation, the author categorizes current research on design studies into two levels: (1) research on the theoretical construction and development of design studies, and (2) research on the development pathways and disciplinary boundaries of design studies. The specifics are as follows:

2.1.1. Level of Theoretical Construction and Development of Design Studies

Research on the Necessity and Practicality of Generalized Design Studies: The necessity of generalized design studies stems from its value as a paradigm-reshaping interdisciplinary theory and its capacity to respond to the philosophy of technology. It serves both as a methodological supplement to design history research under the umbrella of art studies, and as a practical adaptation to technological changes in the natural sciences. It is essential to break down the disciplinary barriers between art, humanities, and engineering, and to construct a "critical reflection–empirical research" double-helix model. The academic lineage shows that Dong Ya reveals a systemic cognitive crisis induced by a narrow view of design through his critique of industrial civilization; Zhou Zhi resolves the paradigm dilemma dominated by instrumental rationality through practical philosophy; and Wang Weiding's multidimensional ecological theory provides solutions for the discipline to meet diverse social needs through cultural gene decoding and technological interface reconstruction, aiming ultimately to achieve a leap from "disciplinary cross-fertilization" to "disciplinary symbiosis."

Research on Interdisciplinarity and Disciplinary Integration Paradigms: Interdisciplinarity is the core challenge in the theoretical construction of design studies. The theoretical framework of "interdisciplinarity" proposed by scholar Zhu Shuai reveals the essential attributes of design studies as a cross-disciplinary field, emphasizing the construction of a pluralistic knowledge system that transcends traditional disciplinary barriers and integrates the humanities, social sciences, and natural sciences [1]. Zhou Zhi constructs a three-dimensional model of "cross-boundary categories, diversified pathways, and practice orientation" to strengthen a dynamic balance mechanism of interdisciplinarity, thereby providing theoretical support for the disciplinary status of design studies [2]. Jin Shu's "theory of core knowledge unity" emphasizes that the fragmentation crisis faced by the disciplinary ontology must be addressed through cognitive consensus to resist the risk of knowledge deconstruction [3]. The 2021 disciplinary catalog's tripartite classification of "art studies/engineering/professional degrees," while reflecting institutional recognition, implicitly harbors a modern dilemma concerning the dissolution of the disciplinary ontology. The differentiated orientations of various research funding systems essentially mirror the deep-seated tension between instrumental rationality and value rationality. The path forward lies in constructing an interdisciplinary knowledge map, systematically reorganizing scattered disciplinary elements, and ultimately achieving a paradigm shift from "disciplinary cross-fertilization" to "disciplinary emergence."

The Subjective Construction of the Chinese Design Studies Discourse System: The key to constructing an indigenous cultural disciplinary system lies in establishing a subjective discourse system for "Chinese design studies." Scholar Zhu Shuai emphasizes that design studies, as an interdisciplinary field possessing attributes of both natural sciences (engineering) and humanities (art studies), derives its legitimacy from its humanistic nature, which determines the validity of "Chinese design studies." [4] Shi Chenxu proposes that the construction of a subjective discourse system for "Chinese design studies" must be grounded in the practice of Chinese-style modernization. By combing through the discipline's developmental trajectory and integrating traditional craft aesthetics

with modern technological resources, it can achieve a transformation from "academic dependency" to "independent innovation." [5].

2.1.2. Level of Research on Development Pathways and Disciplinary Boundaries of Design Studies

Macro-Level Shift toward Interdisciplinary Integration and the Construction of Educational Systems: At present, Chinese design studies are undergoing a paradigm expansion from "middle-range theory" to "macro-level discourse." Scholars such as Zhang Mengqiu point out that the design discipline needs to break beyond a single artistic perspective and shift toward the interdisciplinary integration of "technology and humanities." Li Minmin and others propose a "comprehensive research paradigm" that incorporates user experience, social innovation, and sustainable development into the disciplinary scope, thereby forming a cross-cutting research framework that bridges natural sciences and humanities. [6].

Integration of Design Studies Discipline Construction with Development in the New Era: Domestic design education has long been constrained by a single-category training model, resulting in a lack of cross-domain cognitive competence among scholars. The construction of design studies disciplines in application-oriented universities should adopt a multidimensional perspective on characteristic development, emphasizing the missions of cross-boundary integration, commercial relevance, and forward-looking orientation, so as to achieve comprehensive optimization and improvement of disciplinary construction. Scholars such as Li Ye point out that disciplinary construction and teaching need to avoid homogenized creation through critical design practices, thereby promoting the enhancement of design originality. [7] For instance, Peking University's liberal education (Boya education) attempts to reshape social cognition by cultivating "design gatekeepers," offering new ideas for educational transformation.

Dynamic Balance between Localization and Globalization: Chinese design studies must establish indigenous discursive authority in the process of globalization. The theory of "people-centeredness" proposed by sociologist Li Youmei can serve as a reference for design studies—that is, integrating academic, policy, and social discourses through the concept of "new publicness" to prevent theory from being detached from practice. [8] For example, the Jiangnan University team, in the context of urban renewal in the Yangtze River Delta, has integrated public art with digital technology to explore the "digital regeneration" of urban humanities, reflecting both local cultural characteristics and responding to global sustainability issues.

2.2. Significance of the Research

This research is consistently grounded in the orientation of application-oriented universities, with a close focus on the inclusive and symbiotic relationship between humanistic and artistic intelligence and digital technology. It actively incorporates cutting-edge and practical content such as data science and industrial practice, striving to build a bridge between the sciences and the humanities, thereby truly achieving "genuine cross-fertilization" rather than "pseudo-superposition" in disciplinary integration. On this basis, the study seeks to balance the disciplinary weights between art studies and other relevant disciplines, with particular emphasis on the deep intersection and systematic coordination of economics, management, and design. It rigorously demonstrates the feasibility and necessity of establishing a "grand design" disciplinary positioning within the context of finance and economics-oriented universities, and further proposes a direction for design discipline construction oriented toward the deep integration of core and supporting disciplines, aiming to construct a design discipline system that is both comprehensive and internally synergistic. At the same time, transcending the traditional logic of mechanical "disciplinary patchwork," the research genuinely uses discipline construction as a lever to systematically restructure the teaching system, research mechanisms, and social service system, breaking down the compartmentalization among the three and fostering a disciplinary ecology in which teaching, research, and social service mutually empower and co-evolve. On this basis, it further explores innovative models for the cross-fertilization between the design discipline and the university's core disciplines, advancing construction along three key dimensions—comprehensiveness, distinctiveness, and superiority—paying attention not only to the overall coordination of the disciplinary system but also to differentiated development paths. The goal is to promote high-quality and sustainable development of design studies within the unique context of application-oriented finance and economics universities, thereby forming a model of discipline construction with demonstrative value. [9].

3. Research Content

3.1. Construction of the Disciplinary Ecology

From the perspective of disciplinary symbiosis, the study adheres to the conceptual principle of "dynamic balance" to coordinate the relationships between design studies and related disciplines, avoiding domination by a single discipline or mechanical superimposition. Guided by the construction philosophy of "inclusiveness, diversified development, and broad cross-fertilization," it actively explores and builds a new disciplinary ecology oriented toward the development of new liberal arts and the needs of new quality productive forces. This ecology emphasizes the organic integration of humanities and arts, digital technology, industrial practice, and data science, promoting the self-renewal and systemic evolution of the design discipline within the context of application-oriented universities.

3.2. Construction of the Disciplinary Cluster

Taking "promoting the integrated and coordinated development of discipline construction, program development, regional service, and industry-education integration" as the basic direction, the research strengthens the linkage mechanism between design studies and social development needs, consolidating the design disciplinary cluster through multi-party collaboration. While maintaining the existing advantages of our college's secondary disciplines such as visual communication design, environmental design, industrial design, and fashion design, it actively expands emerging research directions including thinking design, service design, intelligent design, and industrial design. At the same time, it deeply promotes the integration of industry, academia, research, and application, constructing a full-chain disciplinary cluster development model that spans from knowledge production to outcome transformation, and from talent cultivation to industrial service.

3.3. Construction of Disciplinary Directions

Based on a comprehensive assessment of the future configuration of Chinese society and an accurate grasp of the economic development trends in the Jiangsu-Zhejiang-Shanghai region, as well as in Jiaxing and Haining cities, the research integrates and innovates to form four major disciplinary directions: "thinking design, service design, intelligent design, and industrial design." The details are as follows:

3.3.1. Direction of Thinking Design

Centered on "artistic intelligence, social aesthetic education, and visualization research," this direction emphasizes the integration of design thinking and artistic intelligence, exploring how visual expression and aesthetic education can intervene in social issues, thereby enhancing the public's aesthetic literacy and critical thinking.

3.3.2. Direction of Service Design

Focusing on "service intelligence, life wisdom, and management knowledge," this direction pays attention to the interaction experience between people and services, the intelligent enhancement of everyday life scenarios, and the construction of knowledge systems in design management, promoting the deep application of service design in social governance and business innovation.

3.3.3. Direction of Intelligent Design

Characterized by "user experience, interactive gaming, and artificial intelligence," this direction concentrates on human-computer collaboration, intelligent interaction, and immersive experience, exploring cutting-edge fields such as AI-assisted design, intelligent interfaces, and gamification mechanisms, thereby forging a design path that is both technologically forward-looking and humanistically warm.

3.3.4. Direction of Industrial Design

Constructed with the features of "digital-intelligent fashion, costume culture/technology, and fashion aesthetics," this direction leverages the regional advantages of the textile and garment industry, promotes the deep integration of digital intelligence and the fashion industry, attends to the inheritance of costume culture and technological innovation, and forms a design research direction with both industrial recognizability and aesthetic sophistication.

3.4. Planning and Implementation

Based on the first-level discipline platform of design studies, the research systematically advances the exploration of cross-fertilization among secondary disciplines and related multiple disciplines. Through the reconstruction of curriculum systems, the joint construction of research platforms, the integration of teaching staff, and the linkage of social service projects, it diversifies and expands relevant knowledge domains.

4. Analysis of the Discipline Construction Approach

4.1. Fashion Culture and Design Innovation: Serving Local Strategies and Leading Industrial Innovation

This disciplinary direction is guided by major strategies such as serving the national and Zhejiang provincial initiatives of building a "culturally strong province" and promoting the integrated development of the digital economy and the fashion industry. It closely aligns with the construction of Jiaxing's first-class disciplines and the college's task of developing application-oriented disciplinary teams, adhering to the research approach of "cultural guidance, design innovation, industry-education integration, and service to the locality." Its core objective focuses on the contemporary expression and design innovation of local fashion culture, systematically advancing the refinement of disciplinary directions and the construction of distinctive teams around key areas such as the in-depth excavation, digital transformation, and industrial innovation application of local characteristic costume culture resources, striving to form demonstrative achievements in the inheritance of regional fashion culture and design-driven industrial upgrading.

In terms of core research dimensions, this direction vigorously conducts research on the revitalisation and contemporary expression of local fashion culture, systematically examining the rich historical costume culture, intangible cultural

heritage techniques (such as silk, blue calico printing, embroidery, etc.) and regional aesthetic genes within Jiaxing and Zhejiang Province. It explores pathways for creative transformation and innovative development in the context of globalisation and digitalisation, including the contemporary redesign of traditional costume symbols, the fashionable application of intangible cultural heritage techniques, and the narrative construction of regional cultural IPs, thereby enhancing the recognition and communicative power of local fashion culture. At the same time, it advances the digitalisation and intelligent design of costume culture resources, employing cutting-edge technologies such as digital acquisition, virtual simulation, artificial intelligence, and big data analytics to build a local characteristic costume culture gene bank and digital asset platform. Research includes digital modelling of costume patterns and structures, AI-based style transfer and generative design, and the development of personalised costume recommendation systems, driving the evolution of the costume design process towards intelligence, personalisation, and efficiency, and providing the industry with reusable digital design tools and data support. [10].

Furthermore, this direction conducts in-depth research on design innovation-driven industrial upgrading, exploring the core mechanisms of design innovation in enhancing product added value, shaping brand culture, optimising industrial chains, and cultivating new business forms and models such as sustainable fashion, smart wearables, and cultural IP derivatives. Addressing the transformation pain points of regional fashion industry clusters, it proposes upgrading strategies including the construction of brand visual identity systems, product-service system design, and sustainable design methods under a circular economy, assisting the regional fashion industry's upgrade towards high-end, intelligent, green, and integrated development. Simultaneously, it innovates the industry-education integration talent cultivation model by means of co-built laboratories, joint workshops, industry mentorship systems, and project-based teaching, constructing an integrated practical teaching system of "course – project – internship – entrepreneurship". This strengthens students' cultural understanding, cutting-edge technology application ability, cross-disciplinary integration ability, and business practice ability, cultivating high-level, compound design innovation talents capable of meeting future industrial development needs.

In terms of disciplinary team construction, aligned with the overall layout of Jiaxing's first-class discipline development and application-oriented discipline development, the team combines talent introduction, internal cultivation, and flexible expert engagement to form a sustainable academic echelon with a reasonable structure in terms of age, academic background, and professional titles, possessing both fundamental research and applied development capabilities. It particularly attracts high-level talents with cross-disciplinary backgrounds (such as computer science, cultural studies, management) and industrial practice experience. The team further refines its core direction of "Fashion Culture and Design Innovation", establishing distinct recognisability in areas such as the revitalisation of local costume culture, cultural IP development, and industrial design innovation (including integrated application of intelligent manufacturing). It actively undertakes national, provincial/ministerial, and major horizontal research projects, striving to produce landmark achievements including high-level papers, monographs, patents, design outcomes, technical standards, and policy advisory reports. By establishing a "government-industry-academia-research-application" collaborative mechanism, it proactively engages with local government industrial planning, enterprise design innovation upgrading, and cultural project planning, aiming to become an indispensable intellectual support platform and technology transfer engine for the prosperity of regional cultural industries and the high-quality development of the fashion economy, facilitating a substantive leap of the design discipline from academic research to social empowerment.

4.2. Environmental Humanities and Spatial Creation: Integrating Design Practice and Enhancing Regional Spatial Quality

This disciplinary direction is grounded in the national strategies of ecological civilisation construction and high-quality urban-rural development, closely addressing practical needs such as urban-rural spatial optimisation, human settlement improvement, and regional collaborative governance. It serves key areas of Zhejiang Province including new-type urbanisation, future community construction, and rural revitalisation. Leveraging the college's practical advantages in the design discipline and its foundation in humanities and social research, it adheres to the development approach of "spatial synergy, design-driven, and service to the locality", focusing on cross-cutting issues such as spatial design and public governance, humanistic experience and community building, and creating a three-in-one research system of "theoretical research – design practice – social service". The direction is committed to constructing a theoretical and practical framework of spatial creation that integrates humanistic care, ecological adaptation, and social participation, promoting the transformation of urban-rural spaces from traditional physical forms towards cultural expression, social interaction, and living experience. It aims to create a high-quality public space system with regional characteristics and contemporary spirit, continuously enhancing regional environmental perception value and spatial governance efficiency.

Focusing on the "human–environment–space" interactive relationship in the process of urban-rural spatial development, this direction systematically conducts research on environmental humanities and public space experience, paying attention to humanistic perception and environmental interaction in urban and rural spaces. It explores how to enhance the cultural expressiveness, sense of place, and humanistic experience of public spaces through design means, constructing urban and

community spaces with emotional warmth and social vitality. At the same time, it delves into urban-rural spatial renewal and community building strategies, addressing practical issues such as the conservation of historical urban areas, renewal of old communities, and restructuring of rural spaces based on the diverse needs of regional spatial development, proposing spatial governance and construction pathways that are sustainable and locally adaptable. On this basis, it advances research on spatial design integration and media expression, combining directions such as visual communication, product design, and environmental art to explore cross-media and cross-scale design integration strategies in spatial creation, enhancing the diversity of spatial expression and the effectiveness of information communication. [11-13].

This direction further explores mechanisms for regional collaborative governance and design empowerment, addressing development trends such as future communities, smart human settlements, and regional governance. It investigates how spatial design can be embedded into governance systems and empower community collaboration, promoting participatory, systematic, and co-construction and sharing mechanisms in environmental governance. In addition, it carries out research on design education and practice transformation involving multiple stakeholders, oriented towards the integration of teaching, research, and practice, constructing project-based teaching and community collaboration mechanisms grounded in real-world settings, cultivating compound design talents with social responsibility, design integration capabilities, and spatial intervention abilities.

In terms of disciplinary team construction, aligned with the goals of Jiaxing's first-class discipline development and the college's key discipline construction, the team adopts a dual-wheel drive of talent introduction and internal cultivation, establishing an academic echelon with a reasonable age structure, complementary professional backgrounds, and equal emphasis on research and design. Centred on "Environmental Humanities and Spatial Creation", it strengthens research depth and cross-cutting capacity in areas such as spatial experience design, community renewal strategies, and design integration expression, forming recognisable academic labels and research advantages. The team enhances its capacity to apply for national and provincial/ministerial research projects, focuses on improving the quality and transformation capability of theoretical research outcomes, and strives to produce representative achievements with regional demonstrative effects in areas such as spatial design, urban renewal, and community building. Simultaneously, closely integrating local realities, it participates in regional spatial governance projects, assists local governments in spatial planning and community design, and promotes the implementation of design outcomes, effectively enhancing the team's ability to serve local social governance and public space improvement.

4.3. Cultural Translation and Design Practice: Constructing Provincial Cultural Lineage and Building Hardcore Cultural Industries

This disciplinary direction is guided by the strategy of serving Zhejiang Province's goal of building a "culturally strong province", actively responding to the integrated development strategies of "culture + technology", "culture + tourism", and "culture + people's livelihoods". It is grounded in the realities of Jiaxing's discipline construction and regional development, adhering to the research path of "cultural translation, design innovation, interdisciplinary integration, and service to the locality". Its core objective focuses on the creative transformation and innovative development of Chinese design culture. Centred on three major dimensions – cultural gene decoding, modern translation, and regional practice – it systematically constructs a disciplinary ecosystem that forms a closed loop of theoretical research, technology integration, and industrial empowerment, providing academic support for the construction of provincial cultural identifiers, the upgrading of cultural tourism industries, and the cultivation of design talents. [14].

Closely addressing the core proposition of culture-enabled regional development, this direction prioritises research on cultural gene decoding and transformation application, deeply examining the cultural genes of Zhejiang Province and Jiaxing City (including red culture, canal culture, Jiangnan culture, etc.), exploring their core expressive forms and transformative drivers, and proposing pathways for integrating cultural genes into artistic creation and cultural tourism product development, thereby promoting the optimisation of cultural governance systems and the production of distinctive outcomes. At the same time, it advances research on cultural gene activation and cultural identifier construction, employing digital technologies to systematically encode and refine the connotation of Jiaxing cultural identifiers (including cultural relics, intangible cultural heritage, historical figures, etc.), constructing a methodology for building provincial cultural identifiers and strengthening regional cultural distinctiveness.

This direction further explores the development of cultural and museum creative products and brand system construction, promoting pathways for integrating Zhejiang's cultural and museum resources with contemporary life, facilitating the utilisation of cultural relics, the collaborative development of intangible cultural heritage IPs, and the construction of the "Zhejiang-style Gifts" brand system, contributing to the deep integration of culture and tourism. In addition, it carries out research on the cultivation of regionally oriented cultural and creative talents guided by cultural lineage, integrating regional cultural genes into design curriculum systems, constructing a demand-oriented training model for compound cultural and creative talents, and strengthening students' cultural understanding, innovative design ability, and industrial practice capability.

In terms of disciplinary team construction, referencing the goals of Jiaxing's first-class discipline development and the

college's key discipline construction, the team centres on the core direction of "Cultural Translation and Design Innovation", highlighting the research thread of "cross-disciplinary cultural decoding – modern translation – regional empowerment", and forming differentiated advantages in areas such as cultural gene transformation, cultural and museum IP development, and regional talent cultivation. The team deepens university-local government collaboration, providing intellectual support for local government cultural planning, enterprise cultural and creative upgrading, and cultural institution IP development, striving to become a core engine for regional cultural governance and industrial innovation. At the same time, it implements a cultivation mechanism of "real project-driven, deep industry-education integration", strengthening students' abilities in cultural decoding, technology integration, and commercial transformation. It actively undertakes high-level research projects, producing landmark outcomes with academic influence and industrial application value, continuously enhancing the discipline's comprehensive effectiveness in serving regional cultural development.

5. Characteristics and Innovation

5.1. Characteristic Innovation

The exploration of characteristic innovation in disciplinary construction in this research is mainly reflected in the following three aspects. First, focusing on the new finance and economics strategy, it seeks to explore a design community. Against the backdrop of the deepening advancement of new liberal arts construction and the acceleration of a new round of technological revolution, design disciplines in finance and economics-oriented universities urgently need to forge a differentiated path of characteristic development. Institutions such as Ningbo University of Finance and Economics have clearly proposed the interdisciplinary and integrated development approach of "design + technology" and "design + business", centering on the digital creative industry, adhering to both innovative development and staggered development, and have achieved positive results. At the same time, universities such as Tongji University, upholding the new liberal arts construction concepts of upholding tradition and innovation, collaboration and sharing, and the educational perspective of "grand design", have steadily advanced towards a "grand design" talent cultivation model that integrates art and engineering and promotes interdisciplinary cross-fertilization. Formerly siloed specializations have been restructured into cross-cutting directions, breaking down disciplinary barriers and optimizing the interdisciplinary ecology. Inspired by these practices, this research, grounded in the new finance and economics strategy, attempts to reconstruct the underlying framework of design education through the logic of finance and economics, empower economics and management disciplines with a grand design perspective, seek points of value synergy between traditional advantageous disciplines and emerging design disciplines, and explore new pathways for the deep integration of core and supporting disciplines, thereby creating new avenues for value addition in disciplinary attributes.

Second, it emphasizes the symbiosis of internal and external circulation and advocates for digital technology synergy. With the advent of the era of artificial intelligence, the deep synergy between design and technology has become a key trend in the evolution of the design discipline. Design studies has been formally included in the category of interdisciplinary disciplines, and university design disciplines are facing a critical period of digital transformation, urgently needing AI technology to empower disciplinary upgrading, enhance teachers' digital literacy, and innovate teaching models. Institutions such as Shandong University of Art and Design have systematically advanced reform practices of AI-empowered design education, establishing AI design research centers, building AI design service platforms, and developing a series of textbooks, thereby constructing a relatively comprehensive framework for AI-empowered design discipline development. This research advocates the organic integration of digital technology throughout the entire process of disciplinary construction. Through systematic technology platform construction, it aims to eliminate cognitive differences and collaborative barriers among interdisciplinary faculty regarding the positioning of the design discipline, and build a full-chain technical support system of "research project initiation – outcome transformation – teaching mutual benefit", promoting an overall leap in the quality and effectiveness of disciplinary construction through systematic upgrading and sustained practice.

Third, it explores disciplinary construction pathways based on reverse design thinking. Against the background of continuous deepening of educational reform, reverse design, as a teaching design methodology that starts with goals and is competency-oriented, is increasingly being adopted by universities in the revision of talent cultivation programs. Institutions such as Shanxi University of Finance and Economics, focusing on the reconstruction of the education system under the context of the "Four New" constructions (new engineering, new medical science, new agricultural science, new liberal arts), have applied the OBE (Outcome-Based Education) methodology of "reverse design, forward implementation", transforming industry standards and job competency requirements into indicators of graduation requirements, and constructing a three-level matrix support system of "goals – competencies – curricula". Drawing on this methodology, this research systematically applies reverse design thinking to the exploration of disciplinary construction pathways. Focusing on the inherent requirements of the "Four New" constructions, it deduces backward from the endpoints of social needs and industrial transformation to formulate the goal system and implementation strategies for disciplinary construction, closely aligns design innovation education with social development, promotes teaching innovation through competitions, drives research breakthroughs through projects, realizes a long-term

operating mechanism of "teaching-research integration", and continuously enhances the discipline's comprehensive competitiveness and sustainable development capacity. [15].

5.2. Practical Application

At the level of practical application, this research focuses on systematic exploration in the following three aspects. First, it innovates disciplinary collaboration mechanisms. In recent years, Hunan University of Science and Engineering has constructed a new industry-education integration talent cultivation model of "platform-driven, cross-disciplinary empowerment, and three-chain integration". By integrating multiple resources to build a platform for technological innovation and entrepreneurship education, and collaborating with more than 50 industry entities, it has promoted the deep integration of the education chain, industrial chain, and innovation chain, achieving notable results in outcome transformation and student cultivation. Beijing Union University has constructed a collaborative mechanism of "interdisciplinary platform + innovation team" to connect the full chain of "fundamental research – technology development – industrial application". Through vehicles such as modern industrial colleges and collaborative innovation centers, it has promoted the deep coupling of the "discipline chain" and the "industrial chain", forming a disciplinary ecology that serves regional development. Inspired by these practical experiences, this research, based on the "broad resource perspective", systematically integrates resources from government, industry, schools, research institutions, and users, constructing a three-chain synergy model of "education chain – innovation chain – industrial chain". It strives to promote the integrated and coordinated development of discipline construction, program development, regional service, and industry-education integration, effectively addressing the long-standing problems of resource fragmentation and poor collaboration in disciplinary team building.

Second, it constructs a disciplinary ecological system. Against the backdrop of interdisciplinary integration becoming a core direction of higher education reform, many universities are actively exploring the construction of collaborative and symbiotic disciplinary ecosystems. Institutions such as Shandong University of Art and Design have begun to build a collaborative teaching model for the "new art discipline" characterized by industry linkage, resource sharing, complementary advantages, and division of labor, forming an educational ecology through the linkage of multiple stakeholders. Professor Yang Dongjiang from Tsinghua University pointed out at relevant academic forums that deep synergy between design and technology has become a key trend in the evolution of the design discipline, and that design disciplines should adhere to both characteristic leadership and connotative development in the process of technological change. This research innovatively proposes a "dual-chain circulation" research mechanism, establishing a "grand perspective" on teaching and research. On the one hand, it promotes the internal circulation of mutual nurturing between discipline construction and teaching, fostering a virtuous interaction between knowledge production and talent cultivation. On the other hand, it explores an external circulation of cross-disciplinary and cross-field linkage, expanding the discipline's social reach and industrial interfaces, thus forming a disciplinary ecological pattern driven by both internal and external wheels that mutually empower each other.

Third, it optimizes technology empowerment pathways. With the rapid development of artificial intelligence technology, the construction of intelligent research platforms and digital resources has become an important support for enhancing the effectiveness of discipline construction. The "Tiangong Kaiwu" AI design service platform built by Shandong University of Art and Design integrates high-performance computing power and mainstream AIGC tools, trains proprietary intellectual property models for crafts and design arts, and has served over 10,000 users on and off campus, generating thousands of works daily, providing a valuable reference for the digital transformation of design disciplines. The university also took the lead in collaborating with nearly 20 higher education institutions to develop a series of textbooks on "design + artificial intelligence", filling a gap in domestic interdisciplinary textbooks. This research focuses on upgrading the teacher education technology support system, constructing an intelligent research platform, relying on artificial intelligence technology to achieve full-process management and dynamic monitoring of research projects from initiation to execution to completion, and conducting full-chain tracking and evaluation of research project integration, teaching outcome cultivation, and academic talent development. At the same time, through the construction of think tank platforms and the systematic accumulation of project resource databases, it significantly enhances the collaborative research efficiency and resource utilization efficiency of the team faculty, providing continuous technical support and intellectual guarantee for the high-quality development of the discipline.

6. Conclusion

This study, grounded in the orientation of application-oriented universities and employing the symbiosis perspective as a theoretical framework, systematically explores the upgrading pathways of the design discipline against the backdrop of "new liberal arts" construction and the development of new quality productive forces. Through in-depth analysis of disciplinary ecology construction, disciplinary cluster construction, refinement of disciplinary directions, and planning implementation, combined with practical explorations in three distinctive directions—fashion culture and design innovation, environmental humanities and spatial creation, and cultural translation and design practice—the following main conclusions are drawn.

First, the core of design discipline construction lies in achieving a paradigm shift from "disciplinary cross-fertilization" to "disciplinary symbiosis." Traditional disciplinary superposition or patchwork integration can hardly release the innovative potential of interdisciplinary disciplines. This study demonstrates that adopting "dynamic balance" as a conceptual principle and "inclusiveness, diversified development, and broad cross-fertilization" as a construction orientation can effectively coordinate the relationships between design studies and disciplines such as economics, management, and data science, thereby building a new disciplinary ecology that organically integrates humanities and arts, digital technology, and industrial practice. This ecology not only responds to the inherent requirements of characteristic development in application-oriented universities but also provides a theoretical basis and practical pathway for establishing a "grand design" disciplinary positioning within finance and economics-oriented universities.

Second, industry-education integration serves as a key mechanism for the design discipline to transition from knowledge production to social empowerment. By constructing a three-chain synergy model of "education chain – innovation chain – industrial chain" and breaking the long-standing problems of resource fragmentation and poor collaboration in disciplinary team building, it is possible to achieve the integrated and coordinated development of discipline construction, program development, regional service, and industry-education integration. The research confirms that deep university-industry collaboration based on real industrial projects, project-based teaching, and the establishment of an integrated practical system of "course – project – internship – entrepreneurship" significantly enhance students' cultural understanding, technological application ability, and business practice capability, while simultaneously promoting a two-way leap in faculty research capacity and social service capability. Industry-education integration is not only an innovation in talent cultivation models but also an endogenous driving force for the continuous evolution of the disciplinary ecology. [16].

Third, interdisciplinary research in design studies needs to transcend the binary opposition between instrumental rationality and value rationality, constructing a double-helix model of "critical reflection – empirical research." The explorations in the four major directions of thinking design, service design, intelligent design, and industrial design demonstrate that deep integration of design studies with fields such as artificial intelligence, data science, environmental humanities, and cultural research can effectively address the fragmentation crisis faced by the disciplinary ontology. By systematically reconstructing disciplinary construction pathways through reverse design thinking, deducing backward from the endpoints of social needs and industrial transformation to formulate goal systems and implementation strategies, a virtuous mutual nurturing between teaching and research, as well as a dual-wheel drive of internal and external circulation, has been achieved. This methodology provides an operable framework for the differentiated and high-quality development of design disciplines in application-oriented universities.

Fourth, the refinement of distinctive disciplinary directions and team building constitute the practical foundation for disciplinary upgrading. Centering on the three major directions of "fashion culture and design innovation," "environmental humanities and spatial creation," and "cultural translation and design practice," this study has formed a complete closed loop from cultural gene decoding and digital technology empowerment to industrial application transformation. Practice demonstrates that only by grounding in the actual economic and social development of the region and accurately grasping local cultural resources and industrial pain points can a disciplinary brand with distinct recognizability be formed, avoiding homogenized competition. Meanwhile, combining talent introduction, internal cultivation, and flexible expert engagement to build an academic echelon with a reasonable structure in terms of age, academic background, and professional titles is an organizational guarantee for ensuring the sustainable development of the discipline.

In summary, the construction of design disciplines in application-oriented universities should adhere to systematic thinking from the symbiosis perspective, take industry-education integration as a link, adopt interdisciplinary approaches as a method, and use distinctive directions as a lever, continuously promoting the profound transformation of disciplinary logic from "cross-fertilization" to "symbiosis." Future research may further explore collaborative innovation mechanisms between design studies and broader fields such as intelligent technology, social governance, and ecological civilization, as well as the evaluation indicator system for discipline construction effectiveness, so as to provide more solid theoretical support and practical examples for the high-quality development of design disciplines in application-oriented universities under the strategy of building a leading country in education.

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Conflicts of Interest

The author declares no conflicts of interest.

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