

Grounded in the Municipal Industry-Education Consortium: Organizational Logic and Construction Pathways for Art and Design Specialty Groups

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Abstract: With the transformation and upgrading of industries, along with the rapid advancement of artificial intelligence (AI) technologies, higher vocational education in art and design is facing new developmental challenges. As an emerging integrative ecosystem, the municipal industry-education consortium offers a strategic pathway to address these challenges by deepening collaboration between education and industry and fostering the coordinated development of both sectors. Grounded in the framework of the municipal industry-education consortium, this study proposes a top-level organizational model for art and design specialty groups characterized by industry-chain-driven development, interdisciplinary integration, and growth-employment orientation. It further explores multiple development pathways, including innovations in consortium council governance, dynamic talent cultivation models, shared curriculum systems, dual-track teaching teams, and multi-tiered practice bases. Collectively, these pathways establish a comprehensive specialty group system in which core specialties drive development, supporting specialties ensure interdependence, and extended specialties foster mutual advancement. The findings provide theoretical insights and practical guidance for advancing the modernization and high-quality transformation of vocational art and design education, contributing to the cultivation of innovative and application-oriented professionals aligned with industrial restructuring and the development of new productive forces.

Keywords: Municipal industry-education consortium; Art and design specialty groups; Organizational logic of specialty groups; Construction pathway

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1. Introduction

With the rapid advancement of information technology, cultural creativity and design services have increasingly permeated all sectors of the economy and society, exhibiting a trend of multidirectional interaction and

integration. Meanwhile, the extensive application of artificial intelligence (AI) has brought significant changes to the employment market in the field of art and design. AI has reduced dependence on routine design skills and lowered the technical threshold for design practices, resulting in a gradual decline in traditional entry-level design positions. In contrast, emerging occupations such as AI content optimizers, generative designers, and data-driven user experience (UX) designers are rapidly increasing^[1]. In this complex and dynamic market environment, the demand for interdisciplinary professionals who combine artistic literacy with technological competence, such as UX, CAD, and AI-assisted design, continues to grow. Aesthetic capability and creativity are becoming key sources of competitive advantage for future designers. These transformations present new challenges for higher vocational education in art and design, underscoring the urgency of reforming traditional educational models to cultivate technically skilled and cross-disciplinary professionals. Given the high degree of practicality and innovation inherent in vocational art and design education^[2], exploring development pathways that align with contemporary industrial and technological transformations has become an urgent priority.

The municipal industry-education consortium represents a new regional model for the deep integration of industry and education. As an innovative collaborative ecosystem, the consortium responds to the development requirements of new quality productive forces (a concept introduced in China's new development framework) and aims to promote the organic integration of industrial development and talent cultivation^[3]. By consolidating resources from local governments, industries, enterprises, and higher education institutions, the consortium helps to overcome long-standing structural barriers that have hindered effective industry-education collaboration. Moreover, it enhances the coordinated allocation of key productive factors—such as talent, technology, and information—within industrial clusters, facilitating linkage among the “four chains” of industry, education, innovation, and talent. This mechanism supports high-quality regional development and cultivates highly skilled professionals who meet the evolving needs of local economies^[4].

Although previous research has discussed higher vocational art and design specialty groups to varying extents, few studies have specifically examined how the municipal industry-education consortium drives their systematic construction and top-level design. Therefore, this study focuses on the organizational logic and construction pathways of higher vocational art and design specialty groups within the framework of the municipal industry-education consortium. This paper is organized into four interrelated sections. The first section critically analyzes the major challenges currently facing the development of art and design specialty groups. The second section explores the breakthrough role of the municipal industry-education consortia in addressing these challenges. The third section proposes a top-level design framework for constructing art and design specialty groups, while the fourth section outlines specific construction pathways. The findings provide both theoretical insights and practical guidance for advancing the reform of higher vocational art and design education.

2. Challenges in the construction of art and design specialty groups in higher vocational education in China

The concept of a specialty group was first introduced in 2006 in the national policy document *Several Opinions on Comprehensively Improving the Quality of Higher Vocational Education*, issued by the Ministry of Education. This document proposed establishing specialty groups “with key majors serving as the core and related majors providing support”^[5]. Since its implementation, the construction of specialty groups has become a critical entry point and strategic pathway for the connotative development of vocational colleges in China^[6].

In 2019, the Ministry of Education and the Ministry of Finance jointly released the list of institutions selected for China's High-Level Vocational Schools and Specialty Construction Plan (commonly known as the “Double High Plan”), identifying 56 colleges as high-level institutions and 141 as high-level specialty group construction units [7]. Consequently, the development of specialty groups has evolved from localized pilot practices into a key component of national top-level design, emerging as a major strategy for reform and innovation in higher vocational education.

As an essential component of China's vocational education system, art and design specialty groups have achieved notable progress under the Double High Plan. Recent studies indicate that, through continuous development, these specialty groups have actively aligned with national and regional industrial needs, forming distinctive characteristics and achieving substantial advancements in group configuration, industry-education integration, curriculum reform, practice-based teaching, and faculty development. However, their continued development still faces four major challenges [8-14].

2.1. Inadequate top-level design and disordered organizational logic

The construction of art and design specialty groups often lacks comprehensive planning and long-term strategic design. Excessive emphasis on short-term market demand has led to fragmented disciplinary combinations based on superficial classification rather than systematic consideration of internal academic logic and interrelationships. The disciplinary positioning of many specialty groups remains ambiguous, hindering the establishment of coherent talent cultivation systems. Consequently, training models are often misaligned with professional position clusters along the industrial chain, producing narrowly specialized graduates with limited professional mobility and weak capacity for sustainable career development.

2.2. Difficulty in interdisciplinary integration and slow curriculum updates

The rapid advancement of artificial intelligence has driven structural transformations in the design discipline, necessitating a reevaluation of its orientation and development through an interdisciplinary perspective [15]. As cross-disciplinary integration becomes increasingly essential, art and design specialty groups must collaborate with fields such as engineering, business, and cultural studies. However, such integration is constrained by traditional administrative structures within colleges, where departments often operate in isolation. In many cases, interdisciplinary collaboration is limited to offering a few shared or elective courses, which fails to generate genuine synergy or efficient resource sharing. Furthermore, constrained by these institutional boundaries, curriculum renewal has been relatively slow. Many programs continue to emphasize traditional design theories and techniques, without sufficiently incorporating emerging technologies and industry trends, such as user experience design, digital media tools, and virtual or augmented reality. This misalignment between training content and industrial demand leaves graduates lacking the core competencies required for employment in emerging creative industries.

2.3. Challenges in faculty team building and teaching capacity

Faculty development remains a persistent bottleneck in specialty group construction. Due to disciplinary segmentation and departmental silos, it is difficult to establish cross-disciplinary teaching teams. The proportion of high-level “dual-qualified” teachers who combine academic expertise with practical industry experience remains limited. Many instructors enter teaching directly from academia, lacking exposure to real-world production processes and to new occupational roles shaped by digital and intelligent technologies. Enterprise

mentors, who play a crucial role in integrating professional practice into teaching, are often constrained by work commitments, resulting in superficial engagement and limited pedagogical impact.

2.4. Formalized industry-education integration and lack of deep collaboration

Achieving deep and sustained integration between industry and education remains a major challenge. Although many vocational colleges have established cooperation agreements with local governments and enterprises, and some progress has been made in specific disciplines, such collaboration frequently remains confined to internships or short-term training. The motivation of enterprises to engage in long-term cooperation is often weak due to institutional, policy, or social constraints. At the same time, teachers' capacity and initiative to engage with industry and access practical resources remain limited, rendering many school-enterprise partnerships formalistic and ineffective. To address this, it is necessary to broaden collaboration channels, deepen cooperation, and enhance the effectiveness of industry-education integration.

In summary, overcoming these challenges requires aligning specialty group development with the needs of strategic industrial clusters, improving the coherence between academic disciplines and social demands, and strengthening the collaborative integration, optimization, and utilization of regional educational resources—objectives that can be effectively realized through the establishment of the municipal industry-education consortium.

3. The breakthrough role of the municipal industry-education consortium

In December 2022, the General Office of the State Council in China issued the *Opinions on Deepening the Reform of Modern Vocational Education System Construction*^[14]. Building on the achievements of vocational education reform since the 18th National Congress of the Communist Party of China, the document outlined further measures to advance system-wide reform and, for the first time, proposed the strategic task of establishing the municipal industry-education consortium. This initiative has since sparked a nationwide wave of consortium construction.

In April 2023, the General Office of the Ministry of Education issued a notice promoting the construction of municipal industry-education consortia^[16], planning to establish approximately 150 consortia between 2023 and 2025. In November of the same year, the Ministry of Education announced 28 national-level municipal industry-education consortia, which served as exemplary models nationwide and provided valuable references for advancing consortium-based development in higher vocational education.

Scholars have pointed out that the establishment of the municipal industry-education consortium represents an innovative practice aligned with China's evolving approach to industry-education integration in the new era. It is also a key strategic initiative that reinforces the essential mission of vocational education and highlights its distinctive characteristics^[17]. The construction of the consortium aims to deepen the integration of industry and education, promote the high-quality development of vocational education, enhance the modern vocational education system, facilitate regional industrial upgrading, and innovate talent cultivation models. It also supports full-cycle training paradigms and the joint integration of regional resources, thereby establishing a collaborative innovation system linking industry, education, and research^[18,19].

As a new integrative ecosystem, the municipal industry-education consortium provides fresh opportunities for higher vocational education, particularly for the development of art and design specialty groups. It plays a pivotal role in helping these programs overcome long-standing structural challenges through four key dimensions.

3.1. Supporting top-level design through municipal collaboration

The municipal industry-education consortium serves as a complex collaborative framework involving governments, enterprises, and educational institutions. It constructs and refines the ecological structure of regional vocational education based on the distinctive characteristics of municipal-level development. Its core function lies in enhancing the regional adaptability of vocational education and transforming the relationship between industry and education ^[20]. Characterized by cross-organizational collaboration, industry-education integration, and regional distinctiveness ^[21], the consortium provides a solid foundation for the top-level design of art and design specialty groups. By leveraging local resources and comparative advantages, it promotes the inheritance and innovation of regional culture, aligns educational offerings with industrial demand, and enhances cooperation among education, industry, and technology sectors. Moreover, it ensures the synchronization of curriculum content with industrial development, reinforces students' practical abilities and employability, and cultivates high-caliber, technically skilled professionals who meet evolving market requirements. In this way, the consortium effectively fosters the organic linkage of the education, talent, industry, and innovation chains, thereby laying a robust foundation for specialty group development.

3.2. Promoting coordinated governance and supporting interdisciplinary integration

Achieving genuine interdisciplinary integration requires more than crossing disciplinary boundaries; it depends on resource sharing, complementary strengths, and coordinated governance. Given the heterogeneity of resources, management systems, and technical requirements among disciplines, cross-domain resource integration is inherently complex. By constructing specialty groups under the framework of the municipal industry-education consortium, local governments and participating institutions can jointly focus on policy coordination, governance mechanisms, industrial clustering, collaborative talent cultivation, and technological innovation. This collaborative mechanism broadens the scope of educational and technological resources, addresses technical and administrative barriers to interdisciplinary integration, and ensures equitable and efficient allocation of resources, thereby promoting smooth and sustainable cooperation across academic and industrial fields.

3.3. Strengthening faculty development through contract-based collaboration

As noted by Han in *The Connotation, Functional Framework, and Operational Mechanism of the Municipal Industry-Education Consortium*, "Talent is not only the core element of industry-education integration but also the operational foundation of the municipal industry-education consortium" ^[22]. Within this framework, it is essential to establish a multidimensional and bidirectional talent exchange mechanism. This mechanism includes inter-school, school-enterprise, enterprise-enterprise, school-research institute, and enterprise-research institute, forming a diverse and reciprocal system of cross-employment that strengthens the connective and integrative roles of talent within the consortium. Notably, all 28 national-level consortia have adopted this personnel exchange mechanism, effectively addressing the long-standing challenges of faculty development in higher vocational art and design education.

3.4. Ensuring deep industry-education integration through innovation and resource coordination

In developing the municipal industry-education consortium, human, technological, and financial resources are strategically allocated according to regional strengths and industrial development needs. Financial resources are optimized through investment attraction and fiscal coordination to ensure stable and sustainable

operational support. Furthermore, by cultivating and introducing interdisciplinary, high-quality professionals, the consortium builds an innovative and capable talent pool. These coordinated efforts ensure that industry-education integration moves beyond formality toward substantive, high-quality collaboration. With increased fiscal support from local governments and active participation of social and industrial capital, major vocational education projects and reforms can be effectively implemented. This approach not only strengthens policy implementation but also ensures high-quality development of vocational education.

4. Top-level design of higher vocational art and design specialty groups based on the municipal industry-education consortium

The top-level design of specialty groups embodies their organizational logic, which is shaped by educational principles, regional industrial development, technological progress, talent demands, and the institutional characteristics of vocational colleges ^[7]. Within this framework, a top-level design model for art and design specialty groups grounded in the municipal industry-education consortium is proposed.

Anchored in the Consortium, a council provides unified governance that integrates policy guidance with market-oriented management. Supported by a collaborative education platform established through school-enterprise partnerships, a bidirectional feedback mechanism of “industrial demand-specialty group design-talent cultivation” enables dynamic curriculum adjustment and modular system development. This structure also supports the formation of a dual-structured faculty system combining full-time and part-time instructors, a collaborative practice network integrating institutional and enterprise resources, and a multi-level, multi-path talent cultivation mechanism.

From the perspective of the municipal industry-education consortium, the organizational logic of art and design specialty groups follows a model characterized by “industry full-chain drive, interdisciplinary integration, and growth-and-employment orientation.” By systematically mapping the industrial chain, identifying enterprise demands, and aligning educational resources across upstream, midstream, and downstream processes, these specialty groups establish a comprehensive value network that equips students with integrated competencies in design, production, promotion, and operations.

Upstream segment: Focused on creativity and conceptualization, this segment encompasses disciplines such as visual communication design, fashion design, advertising design, and conceptual art design. Through collaboration with advertising, fashion, and cultural-creative enterprises within the municipal industry-education consortium, students analyze consumer behavior, market trends, and cultural contexts to develop market-oriented design concepts and solutions. This process cultivates their ability to extract creative insights from market dynamics, foster innovative thinking, and master visual communication and image-building techniques.

Midstream segment: This stage emphasizes transforming creative concepts into tangible products through disciplines such as product design, jewelry design, fashion design, and industrial design. By partnering with manufacturing firms, fashion brands, and technology enterprises, students engage in the full design-to-production process, learning to integrate design aesthetics with production technologies to create products that are both functional and visually appealing.

Downstream segment: Centered on commercialization and promotion, this segment involves disciplines such as brand design and management, fashion marketing, cultural and creative product planning, and digital media and design communication. In collaboration with brand agencies, digital marketing platforms, and e-commerce enterprises within the Consortium, students learn to embed design creativity into brand communication, apply social media and advertising strategies, and conduct user experience research to enhance

product visibility and market performance.

This model further emphasizes interdisciplinary integration, linking engineering, business, and art and design disciplines through dynamic entry and exit mechanisms informed by big data feedback from industries and educational institutions. This approach ensures flexibility, complementarity, and cross-domain collaboration, allowing specialty groups to evolve toward diversified, synergistic, and innovation-driven development. The integration of art, technology, business, and culture fosters the cultivation of cross-disciplinary, multi-skilled professionals equipped with strong communication and problem-solving abilities.

Finally, a student-centered and employment-oriented mechanism ensures that art and design specialty groups not only strengthen design competencies but also facilitate students' seamless transition into professional practice.

Through the municipal industry-education consortium, students can participate in a real-world project under the joint supervision of instructors and enterprise mentors. This experiential approach enhances their practical competence, problem-solving ability, and workplace adaptability. Furthermore, project incubation and entrepreneurship mentoring within the consortium enhance students' creativity and entrepreneurial capacity. Through innovation studios, entrepreneurship incubators, and related platforms, students transform creative design concepts into viable business ventures, achieving the seamless integration of creativity, education, industry, and entrepreneurship.

5. Construction pathways for specialty groups based on the municipal industry-education consortium

5.1. Innovation in the municipal industry-education consortium council management mechanism

The council of the municipal industry-education consortium has been established to oversee all aspects of consortium operation, guided by regional economic and industrial development. It plays a central role in fostering an innovative policy coordination mechanism that facilitates the joint utilization, integration, and optimization of educational resources. A series of key municipal-level systems should be established, including financial support mechanisms, teacher development frameworks, industry-academia-research collaboration systems, professional advisory committees, and teaching quality assurance mechanisms. Collectively, these institutional arrangements provide a robust governance foundation for the sustainable development of specialty groups.

Under the consortium council, dedicated bodies such as the specialty group construction committee and the industry-academia-research advisory committee should be established. These committees enable agile responses to adjustments in specialty configuration, curriculum optimization, and resource sharing, thereby enhancing operational efficiency and ensuring the effective implementation of policies and initiatives.

5.2. Innovation in the dynamic talent cultivation model

Building upon the framework of the municipal industry-education consortium, an integrated talent cultivation platform should be established to connect industry, academia, research, and innovation. This platform promotes the joint construction and sharing of teaching resources, training systems, and faculty expertise. Through coordinated internal and external collaboration as well as system-wide integration, the structure and training models of specialty groups can be dynamically optimized by leveraging the collective strengths of clustered disciplines.

The talent cultivation system should advance the “five key elements” of curriculum, teaching materials, faculty, training, and specialty development while refining a model characterized by municipal-level industry-education collaboration, art-technology integration, and the alignment of work, course, competition, certificate, and project.

To meet the evolving demands of the labor market, specialty groups should adopt flexible dual-choice course modules and diversify training pathways. These may include order-based programs, modern apprenticeships, innovation and entrepreneurship education, talent excellence initiatives, research assistantships, skills competitions, workshops, and professional training. A credit-exchange and Grade Point Average (GPA)-based management system should be implemented to recognize professional quality credits, support personalized and flexible learning, and facilitate differentiated pathways for student development.

5.3. Innovation in the shared curriculum system

Within the municipal industry-education consortium, the shared curriculum system should be structured around enterprise workflows, guided by employment outcomes, and focused on competency development. Drawing on occupational qualification standards, a comprehensive analysis should be conducted to identify the professional competency requirements across various sectors of the cultural and creative industries, particularly under the influence of digitalization and globalization. Based on these findings, a diversified and modular curriculum framework can be developed, integrating specialized courses, signature programs, and practice-oriented projects.

The curriculum should embody the interdisciplinary character of design education by combining the contemporaneity of the cultural and creative industries with the applied innovation of traditional crafts. It should also reflect the social and cultural dimensions of creative industries while emphasizing internationalization, professionalism, openness, and practical relevance throughout the talent cultivation process.

Grounded in the model of integration of work, course, competition, certificate, and project, the curriculum should clearly define occupational groups, representative job roles, related work tasks, and corresponding core competencies across the entire industrial chain. Occupational groups correspond to course modules, job tasks align with course content, and job standards inform course standards.

Furthermore, professional certification syllabi, design competition requirements, and vocational skills contest frameworks should be systematically integrated into course standards and learning activities. Each module should correspond to specific certificates and competition levels. By embedding professional standards and evaluation mechanisms within the curriculum, this model establishes a demand-driven and competency-oriented educational framework that closely aligns with industry requirements and real-world professional practices.

5.4. Innovation in dual-track teaching teams

The municipal industry-education consortium facilitates the establishment of innovative teaching teams through a dual approach of external recruitment and internal professional development, integrating full-time and part-time expertise. In response to industrial transformation and evolving talent demands, traditional departmental boundaries should be restructured, and teaching teams should be organized around curriculum modules rather than academic disciplines. These modular teams should feature complementary expertise, balanced hierarchies, and reciprocal school-enterprise appointments, thereby strengthening both theoretical instruction and applied teaching.

To ensure sustainable faculty development, a joint school-enterprise evaluation and professional development mechanism should be implemented. Guided by the industry-academia-research committee, faculty competency standards should be defined according to talent cultivation needs, and objective performance metrics should be used for assessment. Evaluation outcomes should inform faculty training plans and career progression mechanisms. Teachers can enhance their expertise through industry placements, specialized training, and enterprise-based learning. Upon completion, they should share their experiences through academic seminars and peer exchanges, promoting continuous professional growth and maintaining high instructional standards across specialty groups.

5.5. Innovation in multi-tiered practice teaching bases

Leveraging the municipal industry-education consortium and guided by the development needs of industrial clusters and specialty groups, a multi-tiered practice teaching system should be strategically designed and integrated. Through coordinated construction, resource sharing, and flexible collaboration, this system should comprise three tiers: public foundational practice bases, professional core practice bases, and extended innovation practice bases.

Existing foundational training laboratories should be upgraded through the integration of new design concepts, methods, technologies, and processes, together with comprehensive hardware and software enhancements. Under the coordination of the consortium, these improvements will support the establishment of high-quality, broad-based foundational practice bases.

Existing professional practice laboratories should also undergo intelligent transformation to create adaptive, technology-enhanced environments for advanced skill development. In collaboration with enterprises, research institutes, and colleges within the consortium, internship and practical training opportunities should be expanded to jointly develop professional core practice bases, thereby strengthening students' professional readiness and applied competence.

Building upon the industry-academia-research-innovation education platform, extended innovation-oriented practice bases should be established to simulate authentic industrial contexts across the entire creative value chain, ranging from concept development and design to production, marketing, and management.

Under the leadership of the consortium council, a comprehensive management framework should be implemented, involving training administrators, instructional supervisors, and enterprise mentors. This integrated operational model, which combines industry, education, research, innovation, and training, enhances openness, collaboration, and instructional quality, thereby improving both the effectiveness of talent cultivation and the overall efficiency of practice education bases.

6. Conclusion

The construction of art and design specialty groups within the framework of the municipal industry-education consortium provides an effective pathway for enhancing the intrinsic dynamism of specialty group development and promoting the deep integration of industry and education. This framework strengthens the alignment between academic disciplines and societal needs, optimizes specialty group structures and configurations, and advances interdisciplinary collaboration and innovation. Moreover, it facilitates the coordinated integration and efficient utilization of regional educational resources, thereby generating new advantages in vocational education governance. By leveraging the consortium's collaborative ecosystem, higher vocational institutions

can cultivate a more adaptive, innovative, and practice-oriented model of art and design education.

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