

*Original Paper*

Research on the Coupling Mechanism and Practice Path of  
“Education Chain” and “Industry Chain” in Vocational  
Education Design Majors

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**Abstract**

*The collaborative coupling of the education chain and industry chain in vocational education for design majors is an important content related to social development and progress, as well as the optimization and upgrading of enterprise development. In the current era of unprecedented prosperity in social culture and art, China's socio-economic development and transformation require innovative vocational education models for high-quality talents in design majors. Based on the perspective of industry and education integration, this article explores the construction of a collaborative coupling mechanism between the education chain and the industry chain, which helps to solve the problems of student skills and enterprise positions, talent supply and employment demand in vocational education for design majors.*

**Keywords**

*design major, education chain, industrial chain, coupling mechanism, practical path*

The General Office of the State Council of China emphasized in the “*Several Opinions on Deepening the Integration of Industry and Education*” that we should deepen the integration of industry and education, promote the connection between the education chain, talent chain, industry chain, and innovation chain. The “*Proposal of the Hunan Provincial Committee of the Communist Party of China on Formulating the 14th Five Year Plan and the 2035 Long Range Goals for the National Economic and Social Development of Hunan Province*” clearly calls for vigorously constructing, supplementing,

extending, and strengthening social chains, promoting deep integration of industrial chains with supply chains, innovation chains, funding chains, and policy chains, improving the modern vocational education system, deepening the integration of vocational education and general higher education, integrating industry and education, and cooperation between schools and enterprises, Vigorously improving the level of vocational education. This has made the deep integration of education and industrialization in vocational education for design majors based on the industrial and socio-economic development of Hunan region a hot topic in the current development of vocational education. From the perspective of coupling the “education chain” and the “industry chain”, explore the practical path of education and teaching in design related vocational schools, and seek effective ways to promote and integrate the education chain and industry chain of design related vocational education. This is beneficial for cultivating innovative and highly skilled technical design related vocational education talents and effectively serving regional industrial development and optimization and upgrading, has very important practical significance.

## **1. The Connotation of Vocational Education, Education Chain, and Industry Chain**

### *1.1 Vocational Education*

Vocational education refers to the education of vocational knowledge, skills, and ethics necessary for the educated to engage in a certain profession or production labor (Qianyou, 2014). Vocational education and general education are two different types. Compared with general higher education and adult education, vocational education is based on professional settings, perfectly realizing vocational and technical skills, and placing more emphasis on the cultivation of practical skills and technologies. Vocational education is closely linked to economic and social development, and is of great significance in promoting employment and entrepreneurship, assisting economic and social development, and enhancing people’s well-being.

### *1.2 Education Chain*

The category of “education chain” first appeared in Xu Hong’s “Education Chain” published in January 2000. The connotation expression of the education chain is diverse. For example, a group of master’s and doctoral students in science and engineering from research-oriented universities proposed an education chain of resource investment, research training, patent conversion, and high-quality employment (Ziyang et al., 2019). From the perspective of the industrial chain, it is proposed that the education chain is generated through professional cooperation, adjustment, and optimization around the industrial chain. The education chain is a value added chain composed of a series of activities that promote talents to master knowledge, develop abilities, and cultivate qualities (Fanshi et al., 2021). According to the education stages and objects of the education system, it is divided into vocational education chain, higher education chain, online education chain, and future education chain. It is proposed that the education chain is a multi-level and multi-dimensional chain of interdependent and restrictive educational elements and links (Guozheng et al., 2021). The education chain of vocational

education in design majors is driven by industry and based on majors, composed of professional layout, professional direction, training plan, teacher construction, curriculum development, teaching activities, practical links, and quality assurance (Fanshi et al., 2021).

### *1.3 Industry Chain*

Albert Hirschman of the United States first proposed the concept of industrial chains from the perspectives of forward and backward linkages in his “Economic Development Strategy” in 1958. Academic research suggests that an industrial chain is an economic concept that refers to a chain organization formed by a specific relationship between a certain industry as the core, its related industries and upstream and downstream industries derived from it. Horizontally, it is a chain of industrial composition, and vertically, it is a collection of all industries involved in a certain industry from upstream to downstream (Fanshi et al, 2021). From the structural and value attributes of the industrial chain and its formation mechanism, there are four main point line corresponding relationships (i.e., four dimensions) in reality - t l chain with “line to line” links, and the value chain with “chain to chain” links (Jinming & Chang, 2006). The industrial chain is also the value creation of enterprise groups around the same industry or related upstream and downstream industries, customers, and other interest groups. It is a chain like relationship form (chain like economic organization system) formed based on different production links and product values. It includes multiple links such as product planning, creative design, raw material production and procurement, product processing and manufacturing, logistics and transportation, market sales, brand promotion and services. For example, the industry chain of environmental art and design mainly involves urban planning, urban design, architectural design, etc. upstream; Downstream involves material enterprises, equipment enterprises, engineering management and construction enterprises, etc. Therefore, the industrial chain is an organic system with network complexity and close connections.

## **2. The Necessity of Coupling the Education Chain and Industrial Value Chain of Design Majors**

Vocational education has become a key variable in the economic development pattern under the background of the global new technological revolution. Experts and scholars have also conducted extensive discussions on whether design majors are closely related to advanced industrial models, and whether the education chain and industrial value chain are synergistically integrated. Experts such as Zongyu Ma and Bo Wang analyzed the problems and development of vocational education in design majors that face industrial demand. They cited phenomena such as the disconnection between design practice teaching and social practice, the separation between design research and design practice, the convergence of teaching models, and the mismatch between the training standards of design talents in universities and market demand under the trend of industry segmentation (Zongyu & Lanlan, 2021).

According to the “*Report on the Development of China’s Design Industry (2019-2020)*”, the number of students majoring in design, the number of award-winning works, and the number of patent registrations in China have ranked among the top in the world. However, the average annual output

value of graduates, the industry conversion rate of award-winning works, and patents are extremely low (Zan, 2019). The cultivation of design talents in traditional universities focuses on workshop style hands-on operations and personal inspiration and creativity training, which is seriously disconnected from industry demand (Yan, 2019). The separation of the “education chain” and the “industrial chain” is the key to this problem, and simply expanding the scale of design education is difficult to serve the high-quality development of the industry.

In the on-site dialogue of the World Vocational and Technical Education Conference held in Tianjin in 2022, experts reached a consensus that cultivating a large number of talents who meet the needs of economic and social development is the main task of vocational education to support economic and social development, improving the degree of adaptation of professional settings to industrial needs, enhancing the degree of adaptation of curriculum systems to job positions, and enhancing the degree of adaptation of practical abilities to production processes.

At the 2022 World Vocational Education Industry Education Integration Expo, Minister of Education Huai Jinpeng stated that we need to deeply explore the new connotations, trends, and measures of industry education integration development, in order to continuously promote open cooperation, exchange and mutual learning, and common development of global vocational education, promote effective integration of industry chain, supply chain, talent chain, and education chain, and promote vocational education to better serve the comprehensive development of people and high-quality economic and social development.

Facing the transformation and upgrading of the design industry and the transformation of educational paradigms, market-oriented and serving the needs of regional economic development, constructing a “education chain” and “industry chain” coupling mechanism for vocational education in the design industry, and creating a design education practice path for innovation throughout the entire industry chain, is a social demand for the knowledge education chain proposed by the development of the value chain in the design industry.

### **3. The Construction of a Mechanism for the Coupling of Education Chain and Design Industry Chain in Design Majors**

#### *3.1 Building a “School Enterprise Cooperation” Platform for Design Majors to Promote Collaborative Coupling between the Education Chain and the Industrial Chain*

The education chain and industrial chain are interconnected and mutually reinforcing organisms. The industrial chain is a complex of industrial elements in social development. As the main body of the education chain, higher education institutions have a direct impact on the quality of students’ employment in the industry chain, which is directly related to the rationality and healthy development of the education chain. Schools are the supply side of talent, while enterprises are the demand side of talent, and the supply and demand relationship between the two is very close. In order to achieve coordination and balance between supply and demand, it is necessary to establish a school enterprise

cooperation mechanism with strong support and guidance from government policy guidance, institutional guarantee, information support, social supervision and other mechanisms, and build a solid and stable “school enterprise cooperation” platform between higher education institutions and production enterprises. This school enterprise cooperation platform has significant characteristics of systematic and professional information services. Relying on the school enterprise cooperation platform, the relevant information of the school and the enterprise can be seamlessly connected in real-time. By connecting relevant universities with corresponding enterprises, this school enterprise cooperation model can be established, stabilized, and developed for a long time.

The construction of a school enterprise cooperation platform first requires the construction of a team of experts. The expert group should regularly evaluate and provide professional guidance on the effectiveness of school enterprise cooperation. Secondly, the construction of a school enterprise cooperation platform needs to establish and improve corresponding rules and regulations, clarify the responsibilities of universities and enterprises, and fully leverage the role of cooperation between universities and enterprises. Once again, it is necessary to continuously improve the cooperation content based on the regional socio-economic development strategy and the rapidly changing situation of scientific and technological changes.

The establishment of a school enterprise cooperation platform for vocational education in design majors can draw on the successful experience of school enterprise cooperation in developed regions, combine the educational resources of the region itself and the industrial advantages of the regional economy, and determine the school enterprise cooperation model. For example, our school’s animation design major has established a school enterprise cooperation with Xiaoxiang Film and Television Company to strengthen the integration of schools and enterprises, connect industries to develop majors, and develop professional construction ideas to promote industry. We optimize the education chain, cultivate the industrial chain, and combine the new trend of integrated development of the Changzhutan urban agglomeration in the school’s area to continuously promote the deep integration of the education chain and industrial chain, build a community of integrated development, and create a brand characteristic industrial cluster. We have made contributions to serving the “three highs and four new” strategy in Hunan, China, and the construction of the “four districts and one place” in Xiangtan. For example, our school’s animation design major has established a school enterprise cooperation with Xiaoxiang Film and Television Company, strengthened the integration of schools and enterprises, coordinated the development of industries and majors, optimized the education chain, cultivated the industrial chain, and combined with the new trend of integrated development in the Changsha, Zhuzhou, and Xiangtan urban agglomerations where the school is located, continuously promoted the deep integration of the education chain and industrial chain, and built an integrated development community. Building a brand characteristic industrial cluster has made contributions to serving the “three highs and four new” strategy in Hunan, China and the construction of the “four districts and one place” in Xiangtan.

### *3.2 Constructing a “Dual Education” Mechanism to Seamlessly Integrate Students’ Design Skills with Design Enterprise Positions*

Strong practicality is a prominent feature of vocational education, requiring students to have strong hands-on abilities. To achieve the goal of cultivating more high-quality technical and skilled talents, skilled craftsmen, and great country craftsmen in vocational education, it is necessary to establish a dual sports personnel mechanism between schools and enterprises, formulate common principles, and achieve deep cooperation between schools and enterprises.

Firstly, schools and enterprises jointly develop talent cultivation plans, based on the needs of industry, industry, and enterprise development, as well as the new situation of scientific and technological development, to develop school professional talent cultivation plans, and achieve zero distance docking between students’ majors and social industry needs.

The second is the joint investment of schools and enterprises in practical training conditions. Both the school and the enterprise jointly build on campus and off campus internship and training bases, design enterprise studios and factory workshops to enter the school, and design enterprise studios and factory workshops for classroom studies to achieve seamless integration between students’ academic work and enterprise production procedures.

The third is the joint appointment of teachers by schools and enterprises. By building a “dual teacher” teacher resource library, developing a management system for external expert technical backbone, and introducing part-time teachers from enterprises into universities. The school and enterprise jointly establish a mixed teaching team, and the enterprise will have senior technical personnel with rich engineering experience stationed at the school to participate in classroom teaching and on-site practical teaching with the school teachers, guide students in course design, and complete teaching tasks. Schools can also send teachers into enterprises and cooperate with them in various projects to achieve mutual exchange and growth of teachers, and improve their professional and technical level.

Fourthly, schools and enterprises jointly develop teaching resources such as courses and textbooks. Both schools and enterprises establish a research and development team to jointly develop online and offline teaching resources such as courses, textbooks, micro courses, and situational dramas.

Fifth, schools and enterprises jointly evaluate the quality of talent cultivation. Both the school and the enterprise jointly participate in the entire process of design professional course evaluation, design project training, design work exhibition and defense, design technology application and service, on-the-job internship and employment evaluation.

We will carry out corresponding special construction in the institutional mechanisms, hardware conditions, teaching teams, practical teaching systems, digital teaching resource platforms, quasi professional management, and social service capabilities of the “dual main body” education system for schools and enterprises, in order to match talent cultivation with industrial needs.

### *3.3 Establish an “Order Based” Model to Promote a High Degree of Alignment between Talent Supply and Employment Demand*

With the rapid development of social economy and technology, the current demand for talent in enterprises is showing an upward trend. If school enterprise cooperation only stays on the formation stage, it is difficult to solve the actual employment needs of enterprises. The combination of education chain and industry chain is to effectively integrate industry education and school enterprise cooperation throughout the talent cultivation process, and it is necessary to reform and innovate the talent cultivation mode of schools. The order based approach is a new talent cultivation model that has emerged in the practice of vocational education reform. Order based approach is a talent cultivation model, which refers to enterprises issuing talent cultivation orders to schools based on their own talent needs and specifications, and then schools carry out talent cultivation according to the orders under the leadership and cooperation of the enterprise, and the talents cultivated are then accepted by the enterprise after passing the acceptance inspection (Yamei et al., 2010).

Order based enterprise talent cultivation adopts the form of basic education mainly based on schools, professional training jointly organized by schools and enterprises, and internship and practical training education mainly based on enterprises. Design enterprises jointly sign training agreements with schools based on industry development and employment needs, and customize professional training plans and courses for design majors. The enterprise selects senior professional and technical personnel to participate in the teaching of professional courses at the school. According to the needs of the enterprise, senior technical teachers of the enterprise take students directly to the enterprise for internships, allowing the design profession to connect with the design industry, allowing students to “learn” or “intern”, combining theory learned in the classroom with enterprise market practice, so that students can enter the position and play a role as mature enterprise employees upon graduation.

This model organically integrates school teaching, enterprise internships, and vocational education, achieving effective connection between professional courses and enterprise positions, zero connection between professional teaching standards and vocational standards, coordinating education and the market, improving the training of vocational talents and students’ ability to adapt to market changes, improving the compatibility between talent supply and enterprise demand, and making the trained students more favored by enterprises. The school not only finds a way out for students to graduate and meets the precise employment needs of enterprises, but also transports talents for the design industry chain, truly achieving the integration of industry, academia, and research.

## **4. The Practical Path of Coupling the Education Chain and Industry Chain in Vocational Education Design Majors**

### *4.1 The Path of Creating a Design Industry Chain and Embedding it into the Education Chain*

#### **4.1.1 Deploy a Design Innovation Chain Around the Design Industry Chain**

Innovation driven is a key factor in building a modern socialist country with Chinese characteristics.

Innovation is more practical, relying more on industrial innovation to cultivate and form new growth points (Liang, 2021).

To adhere to the industrialization orientation, it is necessary to deploy innovation chains around the industrial chain. Firstly, it is necessary to improve the comprehensive quality of design workers, apply modern labor tools with high technological content to improve the production labor of designers, and use newly developed materials to smoothly transform production factors into design productivity. Secondly, it is necessary to promote the transformation from design innovation to design technology innovation, and solve the problem of understanding the regularity of objects to the purpose of artificial objects. Thirdly, it is necessary to promote the transformation from design innovation to design engineering innovation, solve the problems of technical purpose and engineering project integration, and achieve the transformation from design innovation to design engineering innovation. Fourthly, it is necessary to promote the transformation from design engineering innovation to design industry innovation, solve the problems of design engineering integration and design industry universality, and promote the transformation from design engineering innovation to design industry innovation. Fifth, it is necessary to promote the transformation of design industry innovation into the design industry, solve the universal problem of how to apply the design industry, and achieve the transformation of design industry innovation into the generation of the design industry.

#### 4.1.2 Build a Design Knowledge Chain and Curriculum System around the Design Innovation Chain

The design curriculum system is a key carrier for cultivating composite and high-quality design technical skills talents, especially in improving the adaptability of the design curriculum system to job positions. Innovative development is a significant feature of today's society and a characteristic of the times for industry development. The reality of innovative development in the design industry has put forward new requirements for design related knowledge, that is, it is necessary to break away from the original fixed thinking mode of the design curriculum system to adapt to the needs of the times and build a vocational education design knowledge chain and curriculum system.

Firstly, it is to offer basic courses in general design subject technology. Secondly, it is to establish a "platform+direction" design professional course system with clear career position orientation. The platform course focuses on building core competencies that meet the needs of the design industry. Professional groups in the design industry can offer all positions in the design industry that require the industry's core competencies. Thirdly, it is possible to offer shared courses with design industry characteristics that do not have common subject technology connections, for students to choose to study. The fourth is to establish a relatively loose curriculum system for cross departmental cooperation, and develop and design industry-specific courses at the school level for students to choose from.

#### 4.1.3 Innovating the Teaching Mode of Design Majors Around the Path of Design Industrialization

Deepening the integration of industry and education is an important measure to enhance the ability of vocational education to serve economic and social development, and is a key link in promoting the organic connection between the design professional education chain, talent chain, industry chain, and

innovation chain. We can try to establish a design studio teaching model linked by school enterprise cooperation, build a production training base for design enterprises, reform the traditional teaching and education methods for design majors, and establish a platform for the integration of industry and education, and the integration of education and training. We can also try to enter the enterprise apprenticeship program class through a dual selection of design projects, alternating between job advancement courses and practical advancement projects, directly benefiting from the guidance of the school enterprise apprenticeship mentor team. Implement a talent cultivation model of “school enterprise joint education, integration of courses and certificates, and career development” to cultivate vocational and technical talents with higher compatibility for the development of the design industry, and build a highland for talent cultivation in the design industry. The new meteorological model of “order class” is an important way to transport talents to the corresponding design industry.

#### *4.2 Creating a Path for Embedding the Education Chain into the Design Industry Chain*

##### *4.2.1 Aiming at the Development Trend of the Design Industry Chain, Build a Professional Group of Design Education Disciplines*

In the process of embedding the education chain into the industrial chain, industrial demand always plays a dominant role, which will inevitably lead to the emergence of new disciplines in education, prompting vocational education universities to take the industrial chain as the guide, form a distinctive and dynamic design discipline education professional chain and discipline chain, and construct a design education discipline professional group. Building a professional group in vocational education refers to the coupling goal of talent chain and industry chain among three stakeholders, including vocational colleges, industry enterprises, and government, through the formation of professional groups in the game process, the layout structure of professional groups and industry structure, vocational position groups and course structure, teaching process and work process, student evaluation and vocational qualification evaluation can be effectively achieved (Zhao & Yi, 2022). The construction of professional groups in design education disciplines is based on policy measures such as the government’s issuance of professional catalogs, release of talent demand information, and evaluation of exemplary professional groups. The core is to match the vocational position groups of technical and skilled talents in regional industrial clusters, and the key is to optimize and adjust the organizational structure and layout among internal departments, as well as select and evaluate the leaders of professional groups, Based on the efficient division of labor and collaboration among professional teams and the strengthening of the curriculum teaching system, practical teaching system, and education resource system construction, then aim to achieve the coupling of vocational education talent chain and industrial chain.

##### *4.2.2 Reform the Content of Design Education Courses Based on the Needs of the Innovation Chain and Talent Chain in the Design Industry*

The design industry chain, as a functional network chain based on the division of design knowledge, is essentially a “knowledge chain” and “capability chain”. The design talent chain is an important

foundation for supporting the development of the design industry chain and is closely related to the design industry chain. The design talent chain is not only the cornerstone of supporting the effective operation of the design industry chain, but also a key support for promoting the progress of the design industry innovation chain. The education chain is synergistically related to the industry chain and talent chain. The unique attributes of vocational education serving regional economic development determine the inherent consistency of the industrial chain, talent chain, and education chain. The design professional education takes the coupling of the design talent chain and the design industry chain as the basic position, achieving the matching of vocational education curriculum content with vocational standards. Therefore, in the teaching of vocational education design courses, it is necessary to analyze the job tasks of the occupational position group, develop the course content based on the ability standards for competent job tasks, improve the degree to which the course system adapts to job abilities, and enhance the degree to which practical abilities adapt to the production process. Moreover, it is necessary to avoid the disconnection between the course teaching content and the real production and service content in social reality, we cannot teach courses like “driving a tractor on the blackboard or planting crops on the podium”.

## 5. Conclusion

The integration of “education chain” and “industry chain” in vocational education design majors is becoming increasingly urgent in the current economic environment. The vocational education design major, which carries two themes closely related to people’s happiness index, culture and technology, can directly face the industrial design market. By building a “school enterprise cooperation” platform for design majors, it can promote the collaborative coupling between the education chain and the industrial chain, and construct a “dual education” mechanism to achieve seamless integration between students’ design skills and design enterprise positions. Establish a “order based” model to promote the integration mechanism of talent supply and employment demand that are highly compatible. Vocational education in the field of design, which carries the two major themes of culture and technology closely related to people’s happiness index, is directly facing the industrial design market. It can promote the collaborative coupling between the education chain and the industrial chain by building a “school enterprise cooperation” platform for design majors, build a “dual education” mechanism to achieve seamless integration between students’ design skills and design enterprise positions, establish a “order based” model to promote a high degree of compatibility between talent supply and employment demand, and jointly build a fusion mechanism. Vocational education in design majors can construct a practical path of coupling between the education chain and the industry chain by creating a path of embedding the design industry chain into the education chain, and embedding the education chain into the design industry chain. The research conclusion provides a reference for the coupling of “education chain” and “industry chain” in vocational education design majors, which is conducive to promoting the development of vocational education design majors.

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