

# Research on teaching practice reform strategies of environmental design majors integrating production and teaching in Chinese universities

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**Abstract:** *The integration of industry and education is one of the important directions of the strategic adjustment of China's economic structure. In 2017, The State Council of China issued Several Opinions on Deepening the Integration of Industry and Education, pointing out that deepening the integration of industry and education is an urgent requirement to promote the structural reform of the supply side of human resources. As an applied major, environmental design is an inevitable trend to promote the integration of production and education. However, in the process of deepening the integration of industry and education, the environmental design major has encountered multiple problems: turbulent cooperative relations between schools and enterprises, limitations and formalization of teaching, backward teacher team construction and lack of policy support. Through literature review and case analysis, this paper explores the causes and challenges of these problems. At the same time, it puts forward some strategies, such as exploring the way of interest coordination, giving play to the key functions of the government, innovating teaching methods, improving teachers' professional ability and improving the educational evaluation mechanism. The aim is to provide references and suggestions for the theoretical development, direction guidance and personnel training of the integration of industry and education in China's environmental design professional education.*

**Keywords:** *Integration of industry and education, environmental design specialty; Teaching practice; Strategy; Educational innovation*

## 1. Introduction

Since China deepened the reform of economic system and comprehensive reform in the field of education in 2012, this move has promoted the strategic adjustment of economic structure and innovation-driven strategic development, which has brought new challenges to China's higher education: The development trend of high technology and high added value makes the domestic demand for technical talents increasingly strong. As a technical application major closely related to the market, the environmental design major urgently needs to shift from the traditional teaching mode focusing on theory to the mode of deep integration of theory and practice. In the early stage of the construction of the socialist market economy, although China's environmental design professional education tried to "combination of industry and education" and "cooperation between schools and enterprises" and other models, according to the past practice, it was mostly limited to simple cooperation between education and industry, and the problem of "separation of industry and education" was obvious, which made it difficult for graduates to meet the demand for talents in the market. In 2013, as China put forward the policy of "integration of industry and education", the field of environmental design professional education generally responded positively, and constantly improved the system of cooperation between education and industry. However, in the process of promoting the integration of industry and education, the separation of industry and education and the inactivity of school-enterprise cooperation are still obvious, and the vagueness of employment prospects limits the development of environmental art education. Therefore, exploring the teaching practice reform of environmental design specialty under the integration of industry and education has become an urgent research field.

## **2. Analysis of educational practice of environmental design major in colleges and universities under the integration of production and education**

### ***2.1 Turbulent cooperative relationship between education and industry***

In the "integration of production and education" of environmental design specialty, "production" and "teaching" are the core elements. "Production" refers to the industrial sector, including enterprises related to the environmental design profession, such as architectural design companies, design studios and planning institutes. "Teaching" refers to the field of education, including higher education institutions, vocational and technical colleges and other educational institutions offering environmental design. Although the integration of production and education takes into account the common development of both sides in theory, in practice, due to the essential differences between production and education in nature, structure, goals and functions, the realization of deep cooperation is usually hindered.

As an economic organization or system, enterprises often pursue the maximization of economic benefits in production and trading, and enterprise managers pay more attention to the exchange of resources when cooperating with external organizations. However, the benefits that universities and educational institutions can provide in the "integration of industry and education" are usually limited, and it is difficult to stimulate the cooperation motivation of enterprises. In addition, because the market is mostly labor-intensive small and medium-sized enterprises, the demand for scientific research resources of universities is small, so the willingness to cooperate is not strong. Although large enterprises need theoretical innovation and technological transformation, they tend to cooperate with top universities due to the drive of interests. Therefore, in the domestic integration of industry and education, the cooperation between industry and education is generally not deep enough.

### ***2.2 Current teaching situation of interweaving limitations and formalization***

The limitations of the integration of industry and education in environmental design specialty come from many aspects. In terms of policy promotion, the promotion of the integration of industry and education lacks financial policy support. In 2015, the Ministry of Education and the Development and Reform Commission of China jointly issued the Guiding Opinions on Guiding Some Local ordinary undergraduate Universities to Transform into Application-Oriented universities, clearly pointing out that more financial support will be provided to universities for pilot transformation. However, the survey shows that Chinese colleges and universities generally have little or no expected special funds for education, which weakens the motivation of colleges and universities to carry out the integration of industry and education under limited financial conditions. In terms of teaching concepts, since Chinese art and design education originates from traditional arts and crafts, many colleges and universities still leave behind the teaching method of mentoring in the integration of production and education, resulting in teachers leading the classroom while students are mostly in a passive position. According to the motivation theory of American psychologists Desi and Ryan, the motivation of individuals to participate in activities comes from their interest in activities. However, if students passively accept a large amount of unfamiliar and complex professional knowledge, it will be difficult to stimulate their interest in learning, let alone stimulate their motivation for learning their major.

In the major of environmental design in colleges and universities, the formalization of the integration of production and education has become the norm. Although many colleges and universities have responded to the call of the policy, they have established teaching and training bases inside and outside the school. However, these teaching and training bases face many challenges in the actual implementation, especially the shortage of funds, teaching sites and facilities, which hinder the sustainable and effective implementation of the integration of industry and education. Although many training bases serve as nominal partners, they do not provide substantive program resources, usually limited to superficial corporate visits and internships for only a few outstanding students. As a result, when implementing the industry-education integration policy, the overall participation of students is low, and there is a lack of opportunities to combine theory with practice, which makes it difficult for many graduates to quickly adapt to the work environment.

### ***2.3 The construction of teacher team is backward***

In the large-scale professional construction after China's reform and opening up and in the early 21st century, many universities recruit a large number of teachers of environmental design. However,

at that time, the environmental design profession was in the early stage of development, and the shortage of outstanding teachers led to the uneven ability of the recruited teachers, and the teaching quality of the teaching team was difficult to be guaranteed. Nowadays, under the implementation of "integration of production and education" and "double teacher", teachers are required not only to have solid theoretical knowledge, but also to have skilled practical skills. However, the current difficulties are as follows: Although the young teachers have a solid theoretical foundation, they generally lack practical experience in design, which makes it difficult to meet the needs of cultivating application-oriented talents; Although senior teachers have accumulated rich teaching experience, they are conservative in adopting modern educational technology and emerging design concepts, which limits students' exposure to new teaching methods and design thinking.

#### ***2.4 Absence of policy guarantee***

The integration of industry and education promoted by the Chinese central government and its education administration is expected to bring benefits in various aspects, including promoting the development of the real economy, increasing the employment rate of college students, and accelerating the structural transformation and upgrading of universities and industries. From the perspective of economic motivation, the marginal cost of the government's implementation of the production-education integration policy is lower than its potential benefits, which explains the motivation of the government to formulate a number of relevant policy measures. However, the vertical management system from the central to the province, the city and then to the school leads to the delay in the exploration and transmission of the integration strategy of industry and education. At the same time, in the case of limited resources and lack of policy protection, the implementation of municipal governments and universities is relatively insufficient. For enterprises, although there are tax exemption preferential policies for the combination of industry and education, the lack of publicity by the government and the difficulties in the operation of the policies lead to the lack of understanding of these policies by enterprises and universities, which also limits the enthusiasm of integration and cooperation between the two.

### **3. Participants and driving forces in the integration process of production and education of environmental design specialty**

The analysis of the motivation and interest demands of the participants in the integration of industry and education in China's environmental design profession can help clarify the resistance in the process and provide a more accurate reference for the integration policy of industry and education.

#### ***3.1 Administrative department: decision-making body group and driving force***

In the integration of industry and education, the main participants of the administrative departments are governments at all levels and education administrative departments, which play the role of macro managers. By formulating policies and matching resources, they promote the docking between local enterprises and universities, promote the combination of environmental design courses and actual projects, so as to integrate higher education with local economic development and cultivate applied talents who meet the needs of social and economic needs. Administrative departments have relatively sufficient motivation to promote the integration of industry and education, because the expected net benefits are greater than the cost of policy implementation. From the perspective of sustainable development, the implementation of the integration strategy of industry and education by the administrative departments is conducive to optimizing the economic structure, alleviating the contradictions in the educational structure of environmental design majors and other fields, and effectively improving the employment rate of college graduates and promoting the personalized development of schools. This not only enhances the public image of the government, but also helps to promote social and economic development.

#### ***3.2 Enterprise: industrial development group and driving force***

Enterprises, as the key implementers of industrial strategies in the integration of industry and education, can introduce the market demand and industry trend of environmental design majors such as landscape, interior and public art into college education in the process of integration, and provide internship and practice opportunities for students, and help students improve professional skills and

market adaptability through practical projects. In theory, driven by market regulation and technological innovation, enterprises have an urgent demand for highly skilled and innovative talents. However, because many enterprise managers are more concerned about the short-term economic benefits of the integration of industry and education, coupled with the insufficient publicity of government guarantee policies and the poor coordination of industry associations, it is difficult for enterprises to stimulate the motivation of cooperation with universities.

### ***3.3 College teachers: educational practice executive group and driving force***

College teachers mainly undertake the curriculum design and implementation of the integration of production and education. They are not only the imparts of professional knowledge and skills, but also the Bridges between schools and enterprises. The main driving force for teachers to promote the integration of production and education is that they can improve the quality of teaching and research through the integration of production and education, so as to enhance personal career satisfaction and social recognition. However, promoting the integration of production and education means that teachers need to update their teaching content and methods, participate in more education and industry training, and explore the path of school-enterprise cooperation. From the comparative analysis of short-term costs and benefits, the implementation of production-education integration has significantly increased the teaching and research load of teachers, but the salary has not increased correspondingly. This makes teachers become the main undertakers and opponents of the implementation of the integration of industry and education, and it is difficult to mobilize the enthusiasm of teachers to promote the integration of industry and education.

### ***3.4 Students: Policy target group and driving force***

Students are the core beneficiaries of the integration of industry and education, which should have a strong driving force in theory. However, in educational practice, students often hold a negative attitude towards this, which may be attributed to the fact that the integration of industry and education has failed to significantly improve students' employment competitiveness and career development prospects: since most students regard college education as a way to improve their economic and social status, when the integration of industry and education fails to achieve these goals quickly, students' interest and motivation will be weakened accordingly. In addition, due to the limited effect of the initial stage of the integration of industry and education, the new knowledge and academic pressure may cause students to doubt or even resist the deepening of the integration of industry and education, thus increasing the resistance to the development of the deepening of the integration of industry and education.

## **4. Suggestions on the reform method of integration of industry and education in environmental design specialty**

### ***4.1 Explore the way of school-enterprise cooperation and interest coordination***

Exploring the path of school-enterprise cooperation and interest coordination will help realize the deep docking of "production" and "teaching" and achieve mutual benefit and win-win. It is necessary to closely follow the "Several Opinions on Deepening the Integration of Industry and Education" issued by The State Council of China, emphasizing mutualism and coordination of resource supply and demand between schools and enterprises, so as to promote the coordination and unity of interests and goals of schools and enterprises.

First of all, the deepening of the integration of industry and education needs to clarify the interest demands and consensus of schools and enterprises, deepen the communication between universities and enterprises through market research, industry associations and regular consensus meetings, deepen the interaction between the two so as to realize the effective integration of university scientific research resources and enterprise production resources, and promote the coordination between the two systems of education and enterprise on the supply and demand side of human resources. And ensure that education investment accurately match market demand.

Second, new modes of cooperation should be explored. For example, through the construction of industry colleges and joint research and development centers, technology and knowledge will be exchanged in both directions. The teaching practice should integrate the production technology of

enterprises with the market demand, so that the curriculum should be guided by the market trend and guided by technological innovation. It not only improves the applicability and foresight of the educational content, but also strengthens the technical and information consulting support of universities to enterprises. In addition, it is also necessary to establish a reasonable implementation mechanism and supervision system to ensure that educational activities continue to match the needs of enterprises, and timely adjust the teaching cooperation mode and mechanism based on the feedback of practical projects and internship positions provided by enterprises for students, so as to ensure that the curriculum and students' skills can adapt to the rapid changes in the market.

Finally, strategic and technical seminars should be organized regularly to promote the sustainable development of deeper integration of industry and education. This is conducive to continuously promote the integration of interests between schools and enterprises, reduce the ineffective consumption of social public resources, promote the long-term development of both sides, and meet the needs of social and economic development in the new era from the perspective of social construction theory.

#### ***4.2 Give play to the key supporting and guiding role of the government***

The government should develop a clear policy and legal framework to ensure the stable operation and legal support of the integration of industry and education. Legal provisions should be formulated to clarify the boundaries of rights and obligations between universities and enterprises in the integration of industry and education, as well as the distribution of intellectual property rights and income, so as to ensure the fairness and reciprocity of school-enterprise cooperation. The government's incentive and safeguard measures should also not be ignored. The government should promote the implementation of tax relief, subsidies and innovation funds for schools and enterprises, reduce the economic burden of schools and enterprises, stimulate the impetus of cooperation between the two, and encourage enterprises to invest resources and participate in the curriculum design, internship arrangement and technology research and development of colleges and universities. In combination with the establishment of an information platform for the integration of production and education, collect and display information such as school-enterprise cooperation willingness, policy dynamics and market demand, reduce school-enterprise docking costs, and promote the maximization of resource efficiency. The government should also establish a dedicated regulatory body responsible for reviewing school-enterprise cooperation projects, tracking progress and recommending changes to the projects to ensure effective implementation of production-education integration policies and laws.

#### ***4.3 School-enterprise cooperation and diversified teaching methods***

In the current practice of the integration of industry and education, many students hold negative attitudes towards deepening the integration of industry and education due to the vague employment prospects and passive status. In the integration of industry and education, by making full use of school-enterprise cooperation and diversified teaching methods, it is helpful to help students understand industry trends, stimulate students' interest in classroom learning, and enhance students' initiative and participation. The following is an overview of the classroom application of the two different teaching methods for the reference of the integration of production and teaching in environmental design majors.

Simulation scenario project teaching method: Through the collaborative design of teachers and enterprises, according to the actual projects provided by enterprises as a reference, the creation of near-realistic design projects to induce students' situational interest. Take the interior design course as an example, first let the enterprise representatives show the real interior design project and customer needs. Subsequently, students are guided to participate in simulated design projects through group cooperation or role play. In actual operation and team collaboration, students learn the complete process of interior design projects from inception to delivery, and feel the requirements analysis, scheme design, project review and other links of interior design projects. Finally, teachers and business representatives jointly reviewed the design of each group, focusing on practicality, creativity and budget control, combined with evaluation, discussion and analysis of the advantages and limitations of each project, to help students understand the curriculum knowledge and project shortcomings.

Gamification teaching method: Carl Karp, an American educational technology expert, proposed that the introduction of game system in the curriculum can stimulate students' learning motivation and interest. Before the teaching process, teachers can preset a set of evaluation standards, points system

and rewards, and stimulate students' classroom enthusiasm through game feedback mechanism. By setting tasks that echo the learning goals and using the gamified learning platform, students can quickly realize the knowledge feedback loop. Take landscape design course as an example, teachers can assign a community greening project, ask students to explore the given design conditions, and answer the pre-set relevant design questions; Or set up multiple schemes for students to evaluate the feasibility, and then let students complete a landscape design scheme in the form of teamwork. Finally, multi-party evaluation and integral feedback system are used to help students evaluate and reflect on the advantages and disadvantages of their own programs.

In addition to the above-mentioned methods, diversified teaching strategies such as case teaching, demonstration teaching, emotion-driven teaching and interdisciplinary projects can also be adopted in production-teaching integration teaching. These methods should be flexibly selected or comprehensively applied according to the course content and students' specific learning situation.

#### ***4.4 Optimize the construction of teacher teams***

Teaching team is regarded as the key to improve the quality and innovation of teaching in contemporary colleges and universities. According to the definition of team proposed by American scholars Katzenbach and Smith in 1993, teaching team can be regarded as a group of teachers with complementary skills, who share teaching tasks, goals and responsibilities. Excellent production-education integration teaching team depends on the ability of teachers to complement each other, through the integration of teacher resources and reasonable division of labor, promote the healthy development of production-education integration teaching research, implementation and reform.

The concept of "double-qualified teachers" was first put forward in China's vocational education in the 1990s, which means that teachers need to have profound theoretical knowledge, rich practical experience and teaching ability. With the development of application-oriented undergraduate talents training, "double-qualified teachers" have been gradually cultivated and introduced in colleges and universities. The construction of "double-qualified teachers" is helpful to promote the deep development of the integration of production and education. This kind of teacher usually has a more practical background, and can guide students' design creation and project research more deeply, so as to enhance students' professional practice and innovation ability. In addition, the integration of industry and education can provide practical resources and platforms for "dual-teacher" teachers, helping teachers more conveniently contact with enterprise internship and project cooperation, understand the latest trends and technical needs of the industry, and bring actual projects and technological innovation of the industry into the curriculum. Colleges and universities should encourage teachers to regularly study and participate in seminars, academic conferences and cutting-edge technology sharing, so as to continuously enhance teachers' professional knowledge reserve, teaching skills and professional guidance ability. In addition, through the establishment of effective evaluation and incentive mechanism, the process of teachers becoming "double-qualified teachers" is accelerated.

Enterprise part-time teachers have become an important part of the university teaching team, usually with richer industry experience, can provide students with the latest industry knowledge, technology and practice cases, help students to clarify the relationship between learning content and future career, enhance their learning motivation and goal orientation. In the Vienna University of Applied Fine Arts, course teachers from various industries can account for 30%, and their courses are usually closely combined with practical projects, which plays a significant role in promoting the development of the discipline. Enterprise part-time teachers can give the education team more diversified resources and perspectives, effectively deepen the integration of production and education and improve the quality of education.

The integration of production and education is the key direction of the transformation and upgrading of colleges and universities in the new era. Enterprises and universities should respond positively and optimize the allocation of teacher teams through complementary teachers in art, technology and market, so as to promote the sustainable development of the teaching system and curriculum construction of the combination of production and education.

#### ***4.5 Improve the student assessment and teacher teaching evaluation system***

Student assessment can truly feedback students' performance and learning results in the integration of production and education, which is helpful to the evaluation and adjustment of educational content and teaching methods. The evaluation of students in the integration of production and education should

have objectivity, comprehensiveness and fairness, and be evaluated from the evaluation objectives, evaluation standards, evaluation methods and evaluation methods. First of all, we should ensure that students' assessment goals are consistent with the goals of the integration of production and education, and ensure that students' skills and knowledge meet the needs of the industry. Secondly, the evaluation criteria should be relative to the real workplace environment, and students' workplace adaptability should be enhanced through the assessment and project evaluation of simulated practical operations. Thirdly, the assessment methods should be diversified to evaluate the comprehensive level of students. Student assessment should cover multiple evaluation subjects, including teachers and classmates, to avoid a single subjective evaluation. Through student evaluation, students are encouraged to learn from each other and develop their critical thinking and expression skills.

Teachers' teaching evaluation can directly reflect teachers' teaching quality and teaching level, and ensure the quality and standardization of education. The perfect teaching evaluation of production-education integration education should cover the evaluation standards, evaluation tools, evaluation methods and feedback suggestions to realize the cycle of teaching feedback. The evaluation criteria should be based on the goal and direction of the integration of production and education, and the latest standards and needs of the industry should be appropriately introduced to form quantifiable indicators. Evaluation tools should include questionnaires, interviews, observation forms and digital feedback, etc., and comprehensively consider teachers' teaching content, teaching methods, classroom interaction, classroom management and teaching effectiveness to ensure the objectivity of evaluation. The evaluation method should be combined with teacher mutual evaluation, student evaluation and industry experts and other perspectives, so as to avoid the one-sided evaluation. After the collection of evaluation data, the evaluation results should be systematically analyzed, the advantages and defects of teachers' teaching practice should be identified, and suggestions for improvement should be given to teachers to achieve a virtuous cycle of the evaluation system. In order to ensure the sustainability of the teaching practice system of the integration of production and education, universities should adjust the evaluation standards, tools and methods regularly according to the evaluation results and the changes of the teaching and market environment, so as to promote the continuous improvement of the evaluation system.

## 5. Conclusions

The integration of industry and education is the key direction of the modernization of environmental design majors in Chinese universities. The government should play a supporting and guiding role to strengthen the resource exchange and cooperation between schools and enterprises. Enterprises should view school-enterprise cooperation from the perspective of development, take the initiative to build resource information sharing platforms with colleges and universities, provide production resources and industry information for colleges and universities, and promote the benign development of the integration of production and education. Universities should also actively respond to The Times and market dynamics, provide theoretical and consulting services for enterprises, promote mutual benefit and symbiosis between the two sides, and continue to optimize the curriculum system to cultivate application-oriented talents in line with market demand.

As a major focusing on application and creativity, environmental design should attach importance to the cultivation of students' professional skills and professional qualities, and ensure that the educational content is closely integrated with the needs of the industry. The integration of production and education requires the trinity of production, learning and research to jointly innovate educational paths to help students quickly adapt to the job market. The promotion of the integration of production and education cannot be separated from the construction of the teacher team, and teachers are encouraged to develop into "double-qualified teachers", and the teachers of art, technology and market are utilized to ensure that the educational content and methods are contemporary and forward-looking, and promote the sustainable development of the integration system of production and education. The integrated teaching practice of environmental design majors in colleges and universities is a continuous and dynamic process. Scientific and standardized student assessment and teacher teaching evaluation should be carried out in the integration of production and education, and the education system should be continuously optimized, so as to cultivate high-level composite applied talents who meet the needs of society.

### Conflicts of Interest

The author declares that there is no conflict of interest regarding the publication of this article.

### Acknowledgements

Funding: This paper is the phased research result of the 2019 Philosophy and Social Science research project of universities in Guangdong Province under the 13th Five-Year Plan of Education Science, "Research on the Innovation Model of Integration of Industry and Education in Environmental Design Major" (project approval No. 2019GXJK218).

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