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Training Mode of Design Talents under the Concept of Regional Revitalization and Industrial Upgrading

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Abstract Based on the background of the revitalization of Northeast China and industrial transformation, with the goal of serving society with design, leading the future with design, and revitalizing the economy with design, we adhere to the innovative, comprehensive and cultural design talent cultivation concept, fully practice the "student-centered, output-oriented, continuously-improving" educational philosophy taking quality as the first priority, and continuously improve the theoretical system and implementation path for cultivation of postgraduate talents in design science, hoping to optimize the entire process of talent cultivation. Meanwhile, on the basis of "fostering character and civic virtue, cultivating people in a three-all manner, and cultivating people from five aspects simultaneously", we cultivate high-quality design talents with brand-new models and ideas, through a series of educational reform measures, such as strategic cooperation, resource integration, systematic sorting, quality improvement, standard formulation, strengthening characteristics, platform construction, so that the quality of talents and social development can be perfectly integrated and mutually assist each other to achieve a win-win effect, and the training of design talents can be implemented and serve the society.

Keywords Regional revitalization, Industrial upgrading, Design science, Personnel training

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In *Subject Catalogue of Degree Granting and Personnel Training* (2018), the design major is set under 13 categories of art, with the professional code: 1305. In *Catalogue of Disciplines and Specialties of Postgraduate Education* (2022), the design major is set under 14 interdisciplinary categories, with the professional code: 1403, and it can award degrees in engineering and art. The changes in discipline categories will bring deeper thinking to the design specialty[1]. The development of design science will shift from emphasizing aesthetic expression in the past to emphasizing design application in the future, and the best criterion for evaluating design application is whether it can contribute to regional revitalization and industrial upgrading. It should lead human health work and life, promote social change and development, and achieve integrated innovation in design while fully meeting functional and individual aesthetic needs, thereby ensuring the cultivation of distinctive, high-skilled and valuable design talents.

1 Present situation and problems encountered by graduate students of design science in University of Science and Technology Liaoning

The design major of University of Science and Technology Liaoning has three research directions: architectural and environmental art design, animation and digital art design, industrial design and arts and crafts design, which are supported by five undergraduate majors: architecture, environmental design, animation design, product design, and industrial design. The master's degree in design science was approved in 2016, and the first batch of students were enrolled in 2017. Currently, it has enrolled seven batches of graduate students, and four batches of graduate students have graduated. In the past three years, the enrollment scale of each batch of graduate students is about 40. Due to the short construction time of the degree program, the whole training process is a process of constant exploration and constant revision, and there are many problems and difficulties, mainly including five problems. ① The training goal is not clear. After students of the first grade complete the compulsory course examination, students of the second and third grades follow their tutors into the preparation stage of master's thesis. The research goal is scattered and the research depth is low. Although they are academic masters, the research results should also be implementable, and the ability of scientific research transformation and practice is insufficient. It is difficult for various tutors to form a joint force, and the disconnection between theory and practice leads to difficulties for students in employment. ② The training characteristics are not distinct. For the design major in universities located in third-tier cities, there are fewer opportunities to accept new ideas from outside, and the dissemination of information is relatively blocked. Moreover, the academic perspective is single, and the pace of expertise is inconsistent with urban development. Students who stay in such cities for development make less professional contributions to urban development. ③ The artistic connotation is not strong, and students have insufficient understanding of design culture. Although the design schemes have a certain visual impact, they lacks cultural connotation and pursues fashion, resulting in the lack of charm, and it is even more impossible to explore the regional characteristic culture. ④ The scientific research achievements are not outstanding. Due to the lack of high-level professors to take the lead, teachers' scientific research achievements are weak, and they lack the support of national scientific research and teaching topics and influential high-level achievements, and the quality of students' papers is average. ⑤ The scientific research atmosphere is not strong. The college has not formed a strong scientific research atmosphere, and students lack a serious attitude towards scientific research when completing their papers. The communication among various tutors is limited. Students are more willing to participate in design competitions, but pay less attention

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to small papers, patent application and patent transformation.

2 Requirements of regional revitalization and industrial upgrading for the training of design talents

In view of the changes in the national macro-policies of design science and the problems encountered in the process of talent training, we should restructure the talent training system of design science by seeking innovation and change in the changing times. After several years of thinking and practice, we have gradually formed a training mode for design talents in line with the actual situation of University of Science and Technology Liaoning, involving two core viewpoints. ① We should conduct construction around regional revitalization[2], and closely focus on the characteristics of Anshan region to create a distinctive talent cultivation feature for design science. Anshan is the steel capital and jade capital of the Republic, and has the advantages of Tanggangzi mud-therapy hot spring. It is rich in supporting health care resources. The development of urban development and revitalization needs the support of design specialty, which should rely on the superior resources of the city to form its own characteristics around steel culture, jade culture and health care culture. ② We should conduct construction around industrial upgrading. At present, the cultivation of design talents should consider the deep connotation under the surface interface of design works. The designed space and products not only meet the needs of easy-to-use basic level and good-looking aesthetic level, but also have the vision of iterative development of space products and deep-seated cultural needs, so that design can influence social development and change living habits, which is an inevitable requirement to conform to the progress of the times.

3 Training mode of design talents in response to regional revitalization and industrial upgrading

3.1 Establishing patriotic thinking while taking morality as the first priority

Only when students love their motherland and their hometown will they devote themselves to serving the local area with professional knowledge, and helping the development with technology can't be separated from students' feelings about their homeland and pride in their hometown[3]. From the moment when students enter school, strengthening moral education and cultivating people has always been regarded as the foundation of talent training in design science, and we adhere to the three-all education of all-staff education, all-process education and all-round education. The whole process includes giving, supervision and feedback, which are mainly reflected in four aspects. ① Education for new students: It tells the feelings of home and country and the development of life, while imparting professional knowledge, highlighting emotional education, value shaping and the guidance of socialist core values, and establishing students' correct outlook on the world, life and values. ② Staged academic evaluation: It includes the formulation of the Stage Academic Feedback Form. Every semester, tutors, counselors and the dean in charge of graduate work comprehensively evaluate students' scientific research ability, learning state, students' personality and ideological and political performance from three dimensions, so as to timely understand each student's learning situation and psychological changes in school. ③ Ideological evaluation: In the honor selection of outstanding graduate students and outstanding graduate cadres, we adhere to moral orientation first, and increase two links, i.e., ideological and moral scoring and democratic evaluation. ④ Ideological and political education: The syllabus of courses for design science is revised to combine ideological and political elements with professional content, and the full coverage of ideological and political courses and the full participation of teachers are realized, allowing students to learn about, love and be grateful for the motherland in learning.

3.2 Establishing a teaching system while taking rationality as the foundation

The development of everything should follow certain laws, and rationality leads to positive development, and vice versa. The reform of the teaching system of design science always adheres to the rationality of development, explores the clear internal logic between things, and requires that each course in the training plan can achieve ability training requirements and ability achievement indicators[4], ensuring that professional courses are connected in a reasonable orderly transition and mutually supportive way. Meanwhile, the content should be cutting-edge, and keep pace with the times, and it should always be consistent with the development direction of the country. It is mainly reflected in three aspects: ① characteristic courses are added, such as theory and practice of medical and nursing building (medical and health care features), research and practice of rural development (beautiful countryside features), planning of cultural tourism complex and light environment research (environmental lighting features), modern expression of jade carving technology (Xiuyu jade innovation features), etc. These characteristic courses are in line with the key research direction of the college, which can not only ensure the research depth of the courses, but also form a joint research team integrating undergraduates and postgraduates by combining with the graduation project, for joint efforts. ② The contents of courses are adjusted. The teaching contents of research topics 1 and 2 of six design compulsory courses in three professional directions are adjusted, so that the research topics 1 and 2 can be more closely connected, and compulsory design courses and characteristic courses can form a linkage and act in cooperation with each other, allowing students to learn well. ③ Supplementary courses are supplemented. Because there are differences in the purpose and assessment methods of postgraduate courses and undergraduate courses, some auxiliary courses are supplemented to serve postgraduate study, such as design thinking and methods, postgraduate thesis writing and guidance, and amenity design. These courses broaden students' creative thinking and teach students the writing methods of master's thesis. The three kinds of courses are closely related to the development mainline of the three disciplinary directions. They show progressive steps and clear logic, and can complement each other.

3.3 Establishing a supervision system while taking quantity as the principle

Based on regional revitalization and industrial upgrading, the revision of the training standards for design talents takes qualitative assessment as the goal and conducts evaluation quantitatively, and the management standards such as curriculum management, defense management and filing management and graduation requirement standards are revised. Different from the traditional principle-guiding management standards, all the standard assessment points are finally implemented on data indicators[5], and a series of reasonable and appropriate quantitative assessment forms are formulated. The setting of indicators closely focuses on whether it can serve regional revitalization and industrial upgrading and whether it is applied and forward-looking, and enables monitoring on the three-year learning process of graduate students (learning attitude, innovative thinking, scientific research

methods, etc.), learning results (homework quality, paper quality, etc.), tutor's guiding attitude and ability, etc. For example, a series of teaching management documents including students' career record form, course ability achievement assessment form and course reflection record form are innovatively established. Furthermore, follow-up visits are conducted to graduates, so as to analyze their employment destination and employment quality with data. Also, regular visits are conducted to the workplace for graduate follow-up visits, so as to promptly identify and adjust any issues that arise during the training process.

3.4 Perfecting the training link while taking points as the basis

The three-year training process for postgraduates of design is a gradual longitudinal process, and the main logical system includes course study, defense of opening report, mid-term defense, thesis proposal, formal defense. In order to ensure that the teaching system is solid and colorful, many innovative links are implanted in the training process to strengthen the training effect, and points (innovative links) are used as the basis to help the efficient operation of the program (training system). The main practices are as follows: ① the teaching links are improved. The organization of courses from "masters and supervisors' collective discussion" at the beginning of the semester to "review of research results" at the end of the semester has solved the problems of how to teach, what to teach and what to learn, and effectively ensured the completion quality of courses. Through comments and exchanges, students can maximize the benefits of courses and know their own problems and how to improve them in the next stage. ② The defense link is improved. High-level experts from foreign schools and high-level designers from enterprises are invited to participate in the defense in stages, and an external expert database is established. Some experts are also external tutors for master candidates in University of Science and Technology Liaoning[6], which ensures that the theses are accurate in opening, strict in process and excellent in results. In the past three years, from the feedback results of external audit on master theses, the average score has increased from 71.5 to 78.2, and all the external audit results are qualified. ③ The feedback link is improved. Face-to-face activities are conducted between postgraduate dean and students every semester, so that they can face problems directly, speak freely, find problems and solve them in time, so as to keep familiar and close contact among dean, tutors and students.

3.5 Building communication platforms by connecting lines into a plane

In order to better realize the high-quality training of design graduate students, academic exchange platforms with different categories, characteristics and functions are established in the training process. The platforms are important media for communication with the outside world and a guarantee to avoid working behind closed doors and being out of times. The cluster effect and explicit effect in training of design graduate students are realized through the two main academic lines of exhibition and communication, and the multiple collisions form the coverage of enhancing the connotation of design development, bringing in knowledge and enhancing reputation under the communication platforms. First, the first university art museum group in China has been established, including jade carving exhibition hall, architectural model exhibition hall, Qianshan Tianhuang art exhibition hall, northern machine embroidery art exhibition hall, multimedia art museum, Ming and Qing silk exhibition hall, etc. The exhibition hall cluster drives the non-heritage masters to enter the campus, deeply excavates regional cultural characteristics and realizes inheritance of regional skills. The national non-heritage representative inheritor Lu Zhengye is invited to come to the school for exchange and study, and non-genetic inheritance classes are held by cooperating with Anshan Cultural Tourism Bureau. Second, two brand series of academic lectures were established: Gangyuan Master Lecture Hall and Design Art Salon. The Gangyuan Master Lecture Hall invites experts from domestic top universities and enterprise to share their knowledge. For example, Professor Liu Boying from Tsinghua University, Professor Xu Subin from Tianjin University, Professor Zhang Gedong from Communication University of China, and Wang Hongli, the chief architect of China Northeast Architectural Design and Research Institute, have promoted professional development from the most cutting-edge perspective. The Design Art Salon invites teachers, students, graduates and industrial elites to share their study and life on a regular basis, such as century of China art from the perspective of cultural self-confidence, interview and job-hunting experience exchange, and sharing of award-winning experience in professional competitions. The two lectures have different purposes, and can effectively complement each other based on their characteristics of one high and one low, and one serious and one lively. Moreover, they are interspersed with each other, which greatly enhances the academic atmosphere of the college and broadens students' academic horizons. Third, according to the key scientific research direction of the college, academic seminars are held regularly. In 2023, an academic seminar on industrial heritage with the theme of "building industrial spirit and creating the future through cooperation" was held. Through academic conferences, wisdom from all parties is gathered to actively promote the exploration of new paths for the protection and utilization of industrial heritage in China. Fourth, communication and interaction are conducted with the industry regularly, so as to understand the latest development trends through exchanges with the industry and integrate the development trends of the industry into the curriculum. In 2023, a series of academic activities called Entering Xiuyan——Face to Face with Jade Carving Masters were convened.

3.6 Promoting learning through re–search and building practice platforms

Regional revitalization and industrial upgrading are to assess the contribution of personnel training to society. In recent years, the design major of our school has always adhered to the principle of promoting learning through research and promoting learning and research simultaneously[7], and formed three practical platforms relying on the three directions of design, namely, the research and practice of industrial heritage protection, the research and practice of cultural tourism and rehabilitation services, and the research and practice of regional cultural inheritance and renewal. A joint research and practice team led by famous teachers, supported by teachers and participated by students has been formed, and a national industrial heritage protection center has been set up jointly with the Ministry of Industry and Information Technology, and practice platforms such as the University-level Zhizhen Building Innovation Center of University of Science and Technology Liaoning and Aging Science Research Center of University of Science and Technology Liaoning have also been established. In recent years, we have cooperated with Angang Group to complete the protection and renewal of the century Jingjingliao historical and cultural heritage buildings, and completed the third Grand View Garden project in China with the theme of Red House culture with Anshan Cultural Tourism Bureau and Anshan Shitouji Cultural Tourism Development Co., Ltd., realizing a new mode of cultural tourism project combining cultural empowerment,

design creativity and tourism development. We cooperated with Xiuyan County Government, Yutong Museum and Tangshuai Art Museum to sort out the creative thinking of the jade carving works of the New North School, help the cultural development of Xiuyan jade, and establish the Jade Carving College of University of Science and Technology Liaoning in Xiuyan[8]. Moreover, we cooperated with Nantai Town, Haicheng City to jointly develop luggage products, change the quality of luggages in Nantai Town through design, and help Nantai become a major luggage town in the north. The establishment of the practice platforms has been welcomed by students and has become a medium for communication with society. Students' comprehensive ability has significantly improved under platform training, and they have received unanimous praise from enterprises after employment.

4 Conclusions

The training process of design talents has a long way to go. This paper constructed a new talent training system from the perspectives of regional revitalization and industrial upgrading, aiming at improving the value of talent training. We hope that more high-quality design students can serve the development of cities after graduation, and they not only have the feelings of loving home, but also the design strength to achieve a win-win situation for personal development and regional development. Through the construction of talent system in six dimensions: taking morality as the first priority, taking reason as the foundation, taking quantity as the principle, taking points as the basis, connecting lines into a plane, and promoting learning through research. Different dimensions have strong correlation at the same time, and they are parallel from the external appearance, but closely connected internally. Different dimensions are supported by multiple basic elements, which collide with each other in the process of operation, and bring gains and joy again and again by constantly solving problems and contradictions. The training of design talents is a whole chain, and from enrollment to employment, every link is indispensable, and important. After years of operation, the reputation and training quality of this study have been significantly improved, and it can be regarded as a successful attempt and will continue resolutely.

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