Research on Innovative Talents Training Modes of Industrial Design Major in the Era of "Internet Plus"

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Abstract—**The industrial design major in higher education has its own characteristics. Under the background of "Internet plus education", new modes of training innovative talents for industrial design majors will be explored, which will bring new directions for professional development. By constructing core curriculum group, creating diversified classroom teaching methods, introducing the "studio system" of teaching and enriching the extracurricular online learning mechanism, this paper puts forward a new training mode for innovative talents of industrial design major, and strengthens the teaching effect to meet the needs of social development for industrial design talents.**

Keywords—Internet plus; industrial design; innovative talents; training mode

I. INTRODUCTION

Modern universities generally have three basic functions: one is talent cultivation; the other is scientific research, and the third is serving society. Among them, talent cultivation is the core function of universities, and scientific research is the important function of universities and the important carrier of talent cultivation. The extension of the functions of talent cultivation and scientific research is to serve the society[1]. As far as the core function of talent cultivation is concerned, its specific goal should be changed according to the development of the times and the changes of the economic and social environment, so as to promote the core function and play a better role[2].

In the era of mobile Internet, the traditional classroom teaching methods obviously can't meet the students' learning needs. The emerging Internet education mode represented by flipping classroom and MOOC is becoming a new trend of modern teaching reform. In the teaching of industrial design, the usage of Internet technology achieve the combination online and offline teaching methods which will become the development trend of industrial design teaching in many universities.

II. THE INFLUENCE OF "INTERNET PLUS" ON TRADITIONAL EDUCATION

"Internet plus" means making full use of information and communication technology and the Internet platform to make the Internet merge with traditional industries, and stimulate the

development of the local economy under the drive of innovation consciousness, and create new formats for the development of the social industry. At present, "Internet plus" education is mainly embodied in the field of Internet online education, such as the educational service platform set up by schools or institutions, online education platforms organized by institutions, various answers and knowledge memorizing tools, and Internet education projects. In 2015, at China's "Internet plus innovation" conference, experts and scholars from the industry put forward a clear view on the topic of "Internet plus education": "Internet plus" will not replace traditional education, but will make traditional education glow with new vitality [3].

III. THE DEVELOPMENT DIRECTION OF INDUSTRIAL DESIGN MAJOR IN HIGHER EDUCATION IN THE ERA OF "INTERNET PLUS"

On March 14, 2014, the State Council issued "Several Opinions on Promoting the Integration and Development of Cultural Creativity and Design Services and Related Industries", which clearly put forward the development of industrial design and shaping new advantages of manufacturing industry as the first priority task. Therefore, under the new form, that China's develop diversified and innovative talents training mode of industrial design is not only a consideration for enhancing the brand creativity of our enterprises and the international competitiveness of products, but also a measure to enhance our industrial design innovation ability and design leadership in the era of "Internet plus education".

Industrial design is a multi-disciplinary subject with professional knowledge integration. In the "Internet plus education" era, the exploration of theory and practice on innovative talents training mode, will bring new directions for the development of industrial design subject, bring a new mode for innovative talents cultivation of industrial design major, and help to improve innovative ability and design leadership of industry design professionals of our country [4].

IV. NEW MODES OF CULTIVATING INNOVATIVE TALENTS IN INDUSTRIAL DESIGN MAJOR IN THE ERA OF "INTERNET PLUS"

The traditional classroom teaching of industrial design is centered on teachers. Students listen passively, and then they

will do design and drawing exercises. The traditional "Bauhaus Model" in the early 20th century has been the main reference object for industrial design among domestic design colleges for a long time. However, the "Internet plus" era has put forward new personnel training objectives for colleges and universities. Teachers need to develop a new teaching plan, carefully designing the content of each class before class, classroom time division, block teaching content, interactive content, and expected effectiveness. Teachers also need to master modern learning technology, and use various kinds of educational APPs based on the cloud as data platform to realize students' online check-in, online question answering and online discussion. Industrial design, a multi-disciplinary subject intersected with knowledge, is required to adopt new innovative teaching modes in the "Internet plus education" era. It needs to adjust and reform in curriculum setting, training plan, teaching method and teaching staff construction.

A. *Establishing the core curriculum group of industrial design*

Establishing the core curriculum group of industrial design, it can overcome the shortcomings of Internet education-fragmentation and discretization, and ensure the continuity and system of knowledge. Industrial design is a comprehensive applied major, which involves much professional knowledge, including sociology, psychology, management, mechanical technology, art aesthetics and other disciplines. This requires that industrial design education must have a long-term learning, practice and accumulation process. It is a great challenge for design educators to cultivate students' knowledge integration and penetration ability in the system of industrial design education and improve students' comprehensive quality. Therefore, the reasonable setting of curriculum is particularly critical. The knowledge structure that industrial design students must possess includes three essential parts: sociological knowledge, artistic knowledge and technical knowledge. Among them, sociological knowledge is the foundation, artistic knowledge is the professional characteristics, and technical knowledge is the core part of the major [5].

In Internet education, the fragmentation of learning reduces the focus and depth of learners. Students tend to be passive in accepting a large amount of fragmented knowledge and information, which will inevitably lead to students being lazy in thinking and fail to achieve in-depth learning and application of knowledge. At the same time, the fragmentation of learning content will make learners learn scattered knowledge points, and it is difficult to grasp the coherence between knowledge, and can't integrate the knowledge learned, which is fatal to the multi-disciplinary subject like industrial design. Even in the traditional "three-stage" teaching, several self-contained courses have been designed in the various stages of modeling, design and professional design, which have relative integrity. Therefore, it is necessary to strengthen the construction of the core curriculum group of industrial design subject in order to ensure the continuity and integrity of the knowledge of industrial design majors.

Taking the training target of industrial design subject of Lanzhou Jiaotong University as an example, in order to achieve the goal that the graduates should be equipped with

the required abilities, the core curriculum group should be set up. The basic principle of course group construction is independence and innovation. In the course, course group and course system construction; we must deal with the relationship between the three. The core course group is divided into a product design course group and product development and design course group. The specific course set-up is shown in Fig. 1 and Fig. 2.
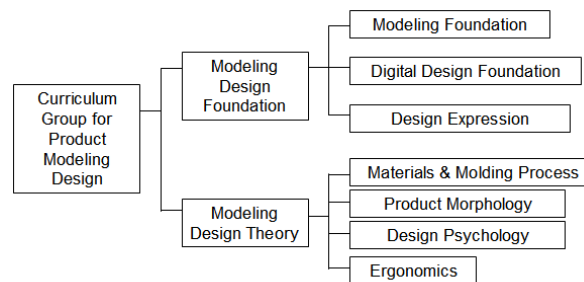

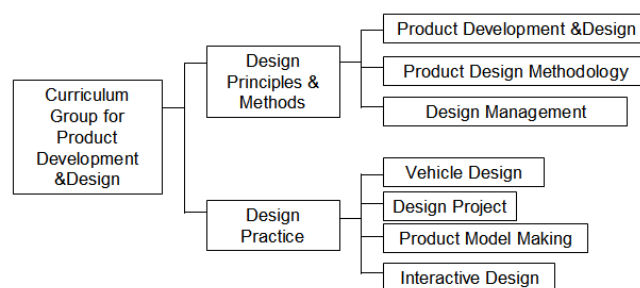Fig. 1. Curriculum Group for Product Modeling Design

Fig. 2. Curriculum Group for Product Development &Design

B. *The "3+1" mode is adopted in the teaching settings of the course*

The "3+1" mode is adopted in the teaching settings of the course. Classroom teaching methods are diversified and micro-classroom; MOOC and flipped classroom are implemented to make the educational methods entertaining and mobile learning convenient. Lanzhou Jiaotong University is a comprehensive university with engineering as its main subject, including liberal arts, arts and other specialties. It implements a flexible mechanism for the training mechanism of industrial design professionals conditionally. The "3+1" mode is applied in the teaching setup in the first stage, the ability of basic knowledge and basic skills can be emphasized in the freshmen and sophomores. Gradually, the junior students enter the design studio organized by the teachers' team and carry out the stage comprehensive project research under the guidance of the teachers. All of these are conducive to integrating the theoretical knowledge of teaching into practice. We should combine curriculum theory teaching with the professional application so as to meet the market demand and provide services for the society. At the same time, a series of elective courses are set up by the teachers' team to meet the needs of students for their professional direction planning, such as furniture design, packaging design, FLASH animation and other courses. The courses are offered partly by teachers in professional teaching and research departments, and partly by

sharing the advantages of other research centers. In the third and fourth grades, we should integrate and optimize all kinds of curriculum units, set up learning contents such as "micro-classroom", "MOOC" and "flipped classroom" to broaden students' freedom of choosing courses, allowing students to choose courses across majors, departments and schools. At the same time, the school will transport students to social companies and enterprises to participate in practical projects expand students' knowledge and improve their practical ability [6].

C. Implementing "project system" and "studio system" in practical teaching and training mechanism

In the aspect of extra-curricular teaching, on the basis of professional theory teaching, we should reform the practical teaching mechanism, set up industrial design studio, and guide students to actively participate in studio projects. Practice teaching can be strengthened by case teaching, project design teaching and thematic design content discussion. Especially, the practice of teaching with strong research and experience should pay attention to the cultivation of students' independent and innovative learning ability. In the specific implementation process, we can break the blindness of using virtual subject training in traditional teaching by introducing enterprise real projects, domestic and foreign design (such as national industrial design competition, red dot design competition, etc.) and special events (such as various celebrations, commemorative meetings, etc.) as the training theme of practical courses, so as to mobilize students' motivation and think deeply about the application of professional theoretical knowledge in concrete projects [7].

D. In extracurricular teaching, we should make full use of network education in the trend of "Internet plus" to meet students' online learning needs

Under the impact of "Internet plus", the boundaries between school education and education training are becoming more and more blurred. The limitations of school education in terms of time, location and manpower can be compensated by the flexibility of education training industry. "Internet plus education" has made a good reconfiguration and integration of educational resources. High-quality educational resources have been fully utilized, and cross-border cooperation project research has become possible. In the era of "Internet plus education", the cultivation of industrial design professionals with multi-disciplinary knowledge integration should allow and encourage students to study outside the school.

The following ways can be adopted:

1) By combining multi-resources and learning modes through a free education platform, it can realize regional cross-border cooperation and development mode.

2) Give full play to the advantages of mobile learning convenience, so that students can achieve learning at anytime and anywhere. By combining the teaching practice and the differences in learning objects, it should respect individual needs and develop teaching APP.

3) Under the "Internet plus education" mode, students can use the high efficiency of social accreditation and obtain

professional credentials through online learning to meet the social recognition of them.

4) Based on the Internet platform, entertainment education is implemented. The use of the "Internet plus" mode enables students to learn professional knowledge while participating in the game. Combing with professional case analysis, it increases students' interest in learning and plays an obvious role in updating rigid learning methods and educational methods.

E. Using "Internet +" to build a practical teaching platform for industrial design.

1) The establishment of a network resource warehouse can stimulate students' interest in learning.

Under the teaching mode of industrial design, the application of the network teaching mode has greatly improved the relationship between teaching and learning, and effectively improved the interest, efficiency and initiative of students' learning. The industrial design practice teaching platform needs the construction of the core course of industrial design, and this platform needs to integrate the advanced technologies such as text graphics, video images, sound animation, virtual reality, etc., to create an image for the practical teaching mode of industrial design. Vivid simulation and virtual simulation scenarios, through the Internet design practice platform, the learning perception, taste and exploration of many outstanding designers and design works at home and abroad, so that students' vision has been greatly improved (in Fig. 3), making the industrial design. The students' understanding of industrial design has gradually shifted from a lack of space to sublimation of students' professional industrial design capabilities.
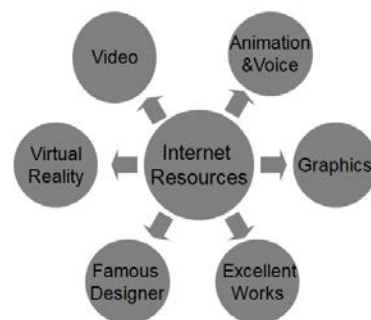

Fig. 3. Internet Resources Analysis Chart

2) Realizing the independent learning of students in the teaching process

In the process of learning professional knowledge, fully exploit the advantages of network resources and the advantages of traditional teaching, encouraging students to integrate the knowledge they have learned, and innovating the design actively. At the same time, through the application of network technology, a complete autonomous learning framework system is constructed, based on the mode of Internet thinking. In such a system, the students' teaching and the teacher's teaching can form a good interaction, according to the students, and the teachers also can do a change from The cognitive level timely, to adjust the teaching content, teaching methods and

other teaching content, adjusting the professional teaching and improving the feedback content timely, so as to teach students in accordance with their aptitude.

F. Practicing of teaching platform can cultivate students' teamwork spirit

Teachers and students, students and students can form a design team through this platform to achieve their respective division of labor and cooperation. Teachers and students can realize the Internet teaching mode through information technology such as email, video conference, and network distance education. Under this circumstance, students can divide their work around the same design topic, and they can brainstorm and complement each other. The conclusions were drawn from the same problem through brainstorming mode that can become more comprehensive and scientific. The team spirit of students is gradually cultivated on the practical teaching platform and innovative ability.

V. Conclusion

The concept of innovative talents training modes includes: the concept of quality education, the concept of general education and the concept of innovative education. In the era of "Internet plus", how to establish innovative talents training modes of industrial design is a matter worth pondering and there is no time to delay. According to the current development situation, "Internet plus" has already prepared for the education reform. In the future, the deepening reform of education system will be more convenient and efficient. The comprehensive reform of personnel training system for industrial design major should be carried out systematically and practically from the aspects of training objectives, core courses, teaching modes, teaching contents, curriculum system, operating mechanism and practical links, so as to highlight the connotation of training objectives, establish professional core curriculum groups, realize diversified teaching modes, set up rich teaching contents and improve dynamic teaching system, establish innovative teaching operation mechanism, and rationally arrange practical teaching, which can effectively link up the various links. In this way can it cultivate students with higher and higher comprehensive quality to meet the needs of social development for industrial design talents.

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