

## To Establish the Art Design Personnel Training Mode with Combination of “A + T”

Liu Jie<sup>1</sup>, Shao Yu<sup>2</sup>

<sup>1</sup>(School of Architecture, Harbin Institute of Technology, China)

<sup>2</sup>(School of Architecture, Harbin Institute of Technology, China)

---

**Abstract :** Most majors of art design established by Chinese engineering colleges lack school-running characteristics; failing to undertake the task of transformation from “Made in China” to “Designed in China” and properly combine with the market environment. This paper, with the starting point of establishing majors of art design based on the school’s development characteristics, explores the establishment of curriculum framework and teaching mode of art design that can meet the need of social development and market. This study is included in the planning project of the Heilongjiang Province Higher Education Academy with the project number of HLJXHB20110316.

**Keywords :** “A+T”, training mode

---

### I. INTRODUCTION

“A+T” is the art + engineering practical personnel training mode (A=Art, T=Technology), which means the “combination of art and technology”; the teaching environment is created by the art design major, as well as the knowledge and capability structure for training personnel. This creative personnel training mode is proposed based on the following background: Most art design majors established by Chinese engineering colleges are imitating and copying the art design mode of the academy of fine arts, failing to form to the school-running characteristics of engineering colleges and undertake the transformation from “made in China” to “designed in China”, as well as organically combine with the architectural environment and market environment. Therefore, it is imperative that the art design personnel training mode characterized by “Combine the art with technology, create and execute simultaneously” be established. In other words, in the context of global economic integration, China’s current education mode must adapt to the fast growing engineering and technology fields. Traditional education places emphasis on imparting academic knowledge but has many defects in the education and training of practical ability, innovation ability, and artistic creation.

### II. INNOVATIVENESS AND TARGET OF THE STUDY

#### 2.1 The Innovativeness of “A+T” Personnel Training Mode

With respect to current ideas and method for engineering teaching—CDIO (“C” and “D” means conception and design, and the key is to cultivate students’ creativity and self-creation ability; “I” and “O” means implementation and operation, and the key is to cultivate students’ execution and practice ability) is a pervasive mode. Specific modes should be attached to special engineering teaching [1]. The art design major is a typical artistic engineering major that needs to implement the design creatively through engineering activities, and has certain particularities in engineering teaching, so that the artistry of teaching cannot be ignored. Therefore, CDIO is not enough for engineering teaching of the art design major. An organic combination of the edification of artistic accomplishment and training of engineering technology should also be highlighted. We will introduce this training mode of engineering talent into the engineering education of the art design major, which not only highlights the personnel training for the art design major, but also presents the features of the ability structure for art design professionals.

Thus, the personnel training mode of “A+T” art + engineering practice, based on the engineering teaching and practical studies of the Harbin Institute of Technology under the guidance of the scientific development perspective, uses design creativity and engineering construction as the carrier to construct the teaching mode for training the art + engineering talent. It establishes the learning mode based on the overall process of engineering projects and curriculum systems to strengthen “practice” as well as enable students to “learn from operation”. Additionally, learning occurs in an active and practical way with an organic relationship among courses so as to cultivate the original creativity and practice power of the undergraduate.

The introduction of the teaching mode of “A+T” art + engineering practice talent education will effectively enhance four abilities of students, including: The basic knowledge of art design and construction ability, individual creative design ability, interpersonal team ability, and engineering system ability, so that students will become elite graduates with both artistic thinking and engineering ability as well as have a “zero adaptive period”. These students will be able to meet the market demand and will be suitable for employment

with international companies. The innovativeness of this study can be summarized as the following four points: The specific proposition of professional training mode is clearly presented; the study can be combined with the international advanced engineering teaching concept and meet the teaching needs of the artistic engineering major; with tight logic and strong implementation, there are a series of feasible actions from the establishment of this concept to the execution of curriculum to ensure the achievement of targeting teaching reform; the study has universal guiding significance for the artistic engineering major.

## **2.2 Construction of the Goal of the "A+T" Personnel Training Mode**

The existing research in teaching achievement has provided a broad platform for the implementation of professional cultivating programs, reformed the cultivating programs, and constructed the curriculum system and teaching mode required by social development. This mode is also practical with great promotional value. Therefore, this mode attempts to fulfill the following goals:

1. Establish the education concept of "being skillful in one aspect", that is, take the training of elite talent as educational goals to improve the teaching mode of "A+T" art and engineering talent cultivation and establish the "A+T" curriculum system. In addition, with the "double-major teachers system" teaching staff as the guarantee, the establishment of fine course construction as the basis, and the finesse of cultivation programs and enhancement of practical teaching as the measurement, cultivate students to be "art design talent that possess international views and value centering on technology, society, and ecology; have the professional knowledge structure of "art and technology" and systematic core knowledge, skill, and attitude of art design, so as to be able to adapt to the social and industrial environment; equipped with the "A+T" accomplishment to be professional and proficient in one discipline of landscape design, interior design, public art design, environmental product design, snow art design, and construction engineering related to architectural environment, and have a foundation of practice and future development potential".

2. Grasp the educational principle of "two broadness", namely, the "wide view and broad selection" principle. The "wide view" refers to the broadening international academic view of teachers and students, enabling them to cooperate in a design project with internationally renowned design companies to improve and strengthen bilingual education with the opportunity of international competition. In addition, the word also means the extension from "book knowledge" to "engineering practice", the development from "individual creativity" to "teamwork", and the expansion from "schema expression" to "effective communication". The "broad selection" refers to separate students in their junior and senior year. The engineering with high practice carries out optional course design; design fields include urban square design, historical block renovation design, ecological landscape design, interior design for commercial space, public art design and so forth, so as to ensure graduates acquire professional talents that align with technical application of knowledge, advanced design concepts, good communication skills and teamwork ability, and understanding enterprise, as well as the ability to carry out design, construction, and management work in the international design institutions.

3. Adhere to the educational policy of "three-in-one combination", which means the art design combines with engineering technical practice, large architectural environment, and social cultural development in education and teaching. It can also be interpreted as the constructive integration with the core of technology, ecology, and society [2].

4. Improve the "A+T" personnel training mode. Formulate the educational reform programs of "combine art with technology, create and implement simultaneously" according to the needs of students and society, as well as update the teaching program and teaching design. Improve "problem-led" teaching. Provide open and practical materials for students for their learning and practice so that students can explore and learn with questions. Offer students guidance for autonomously acquiring knowledge; the curriculum includes a variety of design practice projects that problem design enterprises urgently desire to solve and practice. Cultivate students' theoretical and practical ability to find, analyze, and solve problems. Strengthen the "task-driven" subject design link. Introduce the engineering professional practice environment into the teaching environment, enabling students to complete detailed engineering project tasks and learn by operation. Establish an incentive mechanism to encourage students to rely on themselves or teamwork for exploring, collecting, and arranging relative information data, so as to propose solutions; through the process of inquiry and practice, students can obtain the ability and methods from specific engineering practice and learn to communicate and cooperate. Build a multi-dimensional evaluation system. The evaluation of students will be different from traditional classroom teaching and the traditional education model. The evaluation of students' ability will not only result from teachers and students in the school, but also from senior design companies. Particularly in reference to the evaluation of students' engineering practical ability and industry experience, full-time professional designers will have a say. The evaluation methods should be diversified, which can promote students learning how to think.

5. Improve the teaching evaluation system: Build a multi-dimensional teaching evaluation system that is jointly participated in by students' "self-assessment", teachers' "joint assessment", students' "mutual evaluation", and "external evaluation" from experts outside the school [3].

### **III. CONSTRUCTION OF TRAINING MODE FOR "A+T" ARTISTIC DESIGN MAJOR**

#### **3.1 Construction Scheme of Personnel Training Mode**

1. Expand the international view of personnel training: On the basis of existing personnel training, select a foreign school that has cooperating and carries out inter-school exchanges, summer schools, dual-degree training, short-term survey, hiring of foreign teachers, and other various education programs, so as to strengthen deep cooperation with foreign schools, actively create positive conditions, as well as explore and realize the mode that schools at home and abroad cooperate in education, and jointly award degrees and certificates enabling students to adapt to the development of economic globalization.

Strengthen bilingual curriculum construction. Introduce original teaching materials and join the undergraduate curriculum with that of same majors from foreign countries. Encourage professional teachers to edit English version teaching materials by themselves to enrich the internationalization of the undergraduate curriculum.

Establish and improve the incentive mechanism for teachers and students to participate in the design competition, so as to realize normalization and institutionalization. In addition, establish special funds and regularly organize teams for competition to ensure the stability and competitiveness of the teams.

2. Strengthen students' ability to design: Strengthen originality. The cultivation of students' originality ability not only depends on the accumulation of knowledge and rich practical experience but also includes the cultivation of students' self-construction ability. Through reasonable curriculum configuration, various teaching methods, and multi-dimensional teaching evaluation, students' design ability can be further motivated and strengthened. Strengthen the self-learning ability. Build an assessment diagram venue and implement the comprehensive evaluation mechanism of students' self-evaluation, mutual evaluation, joint evaluation, and external evaluation. Intensify self-learning ability, and improve the digital design exercise gallery. The digital information file center is equipped with computers and a large flatbed scanner, students can surf the internet for free to access teaching information, digital teaching files, and special design schemes from previous students of the school and the college at any time, so as to improve the methods and results of students' self-learning. Intensify practical ability. The organization for curriculum systems gradually carries out the cultivation of ability through experiment, training, and internships. Take advantage of engineering project teaching methods, case teaching methods, and practice base inside and outside the school to carry out internships and implement open education to place personnel cultivation in the engineering project environment.

3. Teachers and students jointly develop the research design team to enhance the research quality and collaboration capability of student teams: More of the successful design works in the world were born on the basis of joint cooperation of their excellent design team and different professionals in relative fields. According to different design tasks and individual differences, the same designer needs to play different roles at different stages of design. Therefore, it's significant to cultivate the research quality and collaboration capability of student teams.

Build an "open" operating mechanism and atmosphere with the teachers and students research team as the core, and emphasize the engineering practice background of the research. Based on breakthrough points of the scientific research project, science and technology competition, innovation funds application, and quality expansion, combine the regional advantages of northeast cold area and the talent cultivation platform of Harbin Institute of Technology with high starting points to make efforts to cultivate students' teamwork awareness and communication skills, so as to achieve independence of students for design and participation in research projects and enhance students' ability to engage in solving practical problems.

#### **3.2 Teaching Staff Construction Scheme**

1. Strengthen teachers' proportion of the "dual-major system": On the basis of the current 71% "dual-major ratio", improve teachers' proportion in obtaining the "dual-major qualification". In addition, teachers should have the qualification of first class registered architect, senior designer or senior industrial artist, in order to improve the market-oriented professional teaching. This will encourage the discipline to develop through the connection of teachers and design market, forming well-constructed academic teams and a stable research direction, and strive to a leading level in the domestic fields as a whole.

2. Focus on training and improving teaching quality for international exchange: Establish a conventional mechanism that excellent teachers go abroad for short-term study, academic exchange, and cooperative research, so as to directly obtain foreign advanced experience and information; on the other hand, accelerate and update teachers' knowledge structure and strengthen academic advanced research work through employing foreign experts.

3. Enhance teaching quality through teaching management: Make a reasonable, scientific and standardized teaching check and analysis of teaching quality; improve the system of regularly attending lectures to develop a comprehensive understanding of teaching situations; encourage formulating individualized teaching design, and normalize the exchange and communication of teaching methods.

4. Break through the traditional teaching mode to improve teaching level: Encourage teachers to break free of traditional teaching methods and realize the transformation from passiveness to independence through basic skills competition of teachers, normalization of exchange of teaching methods, and other approaches. Conduct self-construction and internalize into their inner qualities through their preparation for teaching content and process of teaching; flexibly choose appropriate teaching methods according to students' basis and differences.

### **3.3 Reform in Education and Construction Scheme**

1. Deep integration of teaching content to complete the construction of two fine courses: The two rounds of amendments have been completed for the teaching program and teaching materials construction of art design, so try to construct another two university-level or provincial fine courses. There are 8 cyclic teaching practices of the reform in teaching content in the art design major of the school, as a result, further deepen and integrate teaching content according to academic development needs.

2. Characteristic teaching mode reform: The following guidelines are proposed: Take students at the center of the problems as the guides, the freshmen as the starting point, tasks as the driving force, the full development as the goal, cities in the cold region of northern China as the object of study, the engineering technology as a means to grasp and highlight professional characteristics at the macro level, and organize teaching activities. The specific implementation plans are as follows:

(i) Further deepen the teaching reform scheme. Comprehensively improve students' quality, and stimulate students' initiative and creativity to explore and solve problems through the selection of inquiry-based and open teaching mode.

(ii) Establish a student-centered teaching subject: In the course teaching process, students change from receptive passive learning to autonomous learning of exploration and research type; encourage teachers to design student-centered teaching processes and provide teaching suggestions, and inspire and guide students in key links, as well as promptly evaluate the learning effect.

(iii) Perfect the problem-led learning process: The learning process proceeds from reality, encourage students to rely on themselves or work in teams to explore, collect, and collate relevant information so as to raise questions and solutions; learn to master the course and other related knowledge through the process of research and practice [4].

(iv) Form a task-driven subject design link: Offer students open and practical materials for exercise and practice, enable students to explore and study with problems (i.e., tasks), and provide students guidance to access the knowledge by themselves.

(v) Regard freshmen as the starting point of teaching: Reasonable allocation of curriculum, adopting a flexible teaching method, formulating multi-dimensional evaluation criteria, attaching importance to the sensitivity of freshmen's reception psychology during the teaching process, protecting freshmen's learning passion, awakening their intrinsic motivation to learn, forming their interest in design, and shaping their tenacious character are the starting points for training design talents, and then run through the whole process of design education.

3. Construction of teaching materials: On the basis of the published key construction materials of the Ministry of Education, strengthen efforts in materials construction to seek to complete the compilation of a guide book for reformed curriculum according to the new content of teaching reform, and strive to achieve specifications. Actively promote the trinity three-dimensional textbook construction of textbooks, teaching reference materials, and courseware.

4. Teaching methods: Organize the course teacher to research students' practical situations, predict the learning process, and understand students' reception psychology. Encourage teachers' artistic performance in teaching activities and promote teachers to teach content that can directly touch students' intellect and heart. Require the application of various teaching methods. Since the interest and understanding of freshmen in the design major vary with different types of thinking, teachers can choose a variety of instructional media (such as music, videos, etc.) to stimulate students' interest in drawing training and learning of form composition.

5. Teaching evaluation system: Establish a multi-dimensional teaching evaluation system that is attended by various sectors, including students' self-assessment, teachers' joint assessment, mutual assessment among students, and evaluation from experts outside the school. Avoid forming the simplification of feedback from teaching evaluation, that is, just to provide an evaluation result. Advocate teachers and students to be involved in the whole process of teaching evaluation, and obtain inspiration and enlightenment from it so that the evaluation can be related to the cause and effect.

In conclusion, based on current national conditions, the reform ideas of promoting engineering education and art education simultaneously should be advocated, so that the student of the art design major can not only learn the basic principles of science and technology, but also cultivate their artistic and creative ability, which is an exploration that is based on market demand and can meet the needs of social development. This study has the reference significance to the design education that is committed to cultivating the designer who possess an artistic mind and excellent professional skills as well as can meet the international standard.

#### REFERENCES

- [1] Edward F. Crawley, Creating the CDIO Syllabus, A Universal Template for engineering education: *Frontiers in Education*, 2002. *FIE 2002. 32nd Annual. Frontiers in Education 2. IEEE*, Boston, MA, USA ,2002, F3F/8-F3F/12.
- [2] Brad Allenby, Rethinking Engineering Education: *Sustainable Systems and Technology (ISSST)*, 2011 *IEEE International Symposium on*, Chicago, IL, USA, 2011, 1 – 5.
- [3] Wu Da-Qin, Design and Implementation of CDIO capability evaluation system based on expert system: *Proceedings 2011 International Conference on Mechatronic Science, Electric Engineering and Computer, MEC 2011*, August 19, 2011 - August 22, ChangChun, Jilin, China, 2011, 860 – 863.
- [4] J. Brophy, *Motivation of Stimulating Study* (Shanghai: Press of East China Teacher University, 2005:38, ISBN: 9787561742228).